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SWIMMING ANALYZED

BY

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NEW YORK

A. S. BARNES AND COMPANY

INCORPORATED

1935

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PRINTED IN THE UNITED STATES OF AMERICA

FOREWORD

Swimming has and continues to hold a most important place in the program of Physical Education. Doubtless one reason for this is that swimming is not a matter of a formal class but a useful and delightful sport in every-day life as well as an important safety device. Not only in swimming itself but rather in all water sports there is the satisfaction of individual effort combined with relaxation which makes this activity truly recreational and one which deservedly ranks high in popularity.

Even in the early days when an extremely restricting costume was required for women, swimming was mentioned as a most beneficial form of exercise. Colleges for women early in their history strove for a "swimming bath" even if as at Smith College "no more than five and no less than two" were permitted in the pool at the same time. The teaching of swimming then consisted of dangling the pupil on a rope suspended from a crane. The crane was then pushed up and down the pool while the pupil maneuvered as best she could on the surface of the water.

One could not call this "Swimming Analyzed" as one may call the thoughtful progression used by the present day instructors. Nor are these instructors contented with merely teaching a few strokes. To-day many girls not only develop their form in swimming to a surprising degree for amateurs but develop diving ability as well. A new feature of the sport is stunt and formation swimming. This is much enjoyed both by those who watch the performance and by those who participate. For formation swimming is not merely a matter of a few experimental stunts, it requires strength, control, and a perfection of form which few girls would attain for form's sake itself. But to use the form acquired in some definite way produces persistent effort on the part of the student which is rare in most situations. Formation swimming in addition does not involve intense competition, and while competition in swimming, diving and for

▼

form and speed have a valuable place in the swimming program, nevertheless stunt and formation swimming add a useful, new and interesting element to the art of aquatics.

Those who have seen the swimmers developed by Miss Goss and the interesting programs given by her teams and classes know that the method she uses is a good one. They are pleased that she has at last been persuaded to put this valuable material in written form where it may be of use to other teachers. It will interest those who are reading this book to know that the methods herein described have been used at Smith College the past eight years with most satisfying results.

DOROTHY SEARS AINSWORTH, PH.D.

*Director of Physical Education and Associate
Professor of Physical Education, Smith College*

ACKNOWLEDGMENTS

The object of this book is to present in order a possible teaching progression in swimming, diving and stunts from the beginning through the advanced stages.

Also under this cover is included information on the "Care and Sanitation of the Swimming Pool," for which material I wish to thank Miss Elizabeth F. Genung, Associate Professor of Bacteriology, Department of Health, Smith College.

As "athlete's foot" has grown to be a problem in the use of swimming pools there is included a chapter on its causes, treatment and preventive measures. For information on this subject I am indebted to Dr. K. Frances Scott, Associate Professor of Hygiene, Smith College.

For the illustrations which portray the various positions which I have attempted to describe, I wish to thank Miss Dorothy Dunning, Instructor of Physical Education, Smith College.

For coöperation in the preparation of the manuscript I wish to express appreciation to Miss E. Pearle White and Miss Hope Wilmarth.

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SWIMMING ANALYZED

CHAPTER I

BEGINNING SWIMMING

An elementary progression.

- I. Eliminating Fear of Water
- II. Breathing and Relaxation
- III. Face Float and Stand
- IV. Back Float and Stand
- V. Change of Body Positions
- VI. Elementary Back Stroke
- VII. Elementary Crawl
- VIII. Jumping and Diving
- IX. A Lesson Plan for Beginners

I. Eliminating Fear of Water

Many people have a great fear of the water. This fear must be overcome and students must become accustomed to the water before they can with any ease and comfort learn a single stroke. There are many ways of accomplishing this but first of all beginners should have absolute confidence in the person who is trying to teach them. The following methods have been used successfully with many individuals:

1. Join hands in shallow water, jump up and down, submerging first to the shoulders, then, entire head. COME UP SMILING.
2. All form a line along the side of the pool. At a given signal walk as fast as possible to the other side of the pool.
3. Pick up objects from the bottom of the pool in the shallow end. Give each person four objects to be picked up. See who can pick up all first.
4. Join hands by twos. Submerge heads and look at each other under the water.

II. Breathing and Relaxation

The two fundamentals on which swimming depends are BREATHING and RELAXATION. Proper breathing is difficult because people are afraid to put their faces in the water, so instead of relaxing, they become tense. The correct breathing in all swimming is IN through the mouth and OUT through the nose.

WAYS OF TEACHING THIS

1. Have the students stand in water facing the instructor. Without putting their faces in the water have them breathe IN through the mouth, OUT through the nose, taking a quicker inhalation than exhalation.
2. Practice the same starting with the shoulders submerged and putting the face into the water to exhale. While this is being done the instructor should look for bubbles around the students' heads, which is an indication that they are pushing the air out under water. If no bubbles appear they are holding their breath under water. To help in such a case suggest a deep sigh when exhaling. Sometimes it is necessary to tell the students to have the lips slightly apart in exhaling and to breathe out through both the mouth and the nose at the same time.
3. Have the students practice opening their eyes under the water and breathing out at the same time. To help accomplish this have them try—
 - a. Joining hands in couples, submerge, look at each other under water and breathe out.
 - b. Putting faces in the water, open the eyes and count toes.

Breathing should be practiced until the students feel absolutely at ease and have lost the tense strangled feeling often experienced in the beginning. To some it will come fairly easily but many must spend a part of each lesson practicing this until it is finally mastered. One can even practice breathing at home into a basin of water.

Some simple shallow water games for beginners are:

1. *Picking up objects.* Give each four objects. Let each race to see who can be the first to pick up all four.
2. *Cap Tag.* Make several persons "It" according to the size of the class. In order not to be tagged the entire cap must be under the water.
3. Have pupils form a line along one side of the pool. At a signal grasp ankles and race to see who can walk the farthest.
4. Give each member of the class a number. Have them form a circle. Throw an object into the center of the circle and call a number at the same time. The one whose number is called must try to recover the object before it goes to the bottom.
5. Divide the class in two teams—one on each side of the pool. Give each group corresponding numbers. Throw an object into the pool calling a number. The students whose number is called must try to recover the object before it goes to the bottom.
6. *Ball Tag.* The players are scattered around the shallow end of the pool. One is "It" and has a ball. The one with the ball throws it and tries to hit one of the players. When hit with the ball that player is "It."
7. *Whistle Tag.* The players are around the shallow end of the pool, each blindfolded. One has a whistle and is not blindfolded. Those blindfolded try to catch the player with the whistle who must whistle fairly often to give the others some idea as to where she is.
8. *Couple Tag.* Players are in couples with hands joined. One couple is "It" and tries to touch other couples without letting go of hands. Letting go of hands while being chased makes that couple "It." If one of the couple is touched they become "It."
9. *Pick Up.* Players choose two teams. About twenty-five objects are put on the bottom of the pool. The two teams enter the water from a sitting dive into the pool. The team picking up the most objects wins.

The second fundamental of swimming is relaxation. Since one cannot attain ease in any stroke without this, students should be made to realize that the water will hold them up without any effort at all on their part. The only effort they need use is in manipulating their stroke across the water. Experience has shown that proper practice of the back and face float is a method of attaining relaxation.

III. Face Float and Stand

In floating the arms and legs are always motionless, the student simply lies on the water. It is essential that the body be relaxed.

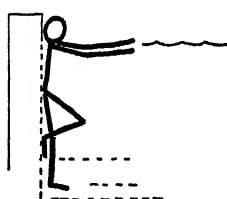


FIG. 1

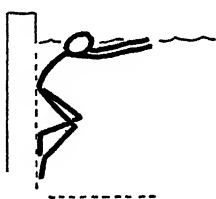


FIG. 2

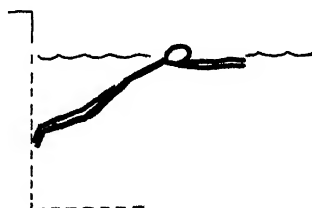


FIG. 3

Have the students stand with their backs against the side of the pool, one foot flat against the wall, knee bent, one foot on bottom of the pool, the arms extended forward, the shoulders under water. Have them take a breath, bend forward and at the same time bring the foot from the bottom to the wall, push off with both feet from the side, face in the water. They should breathe out slowly, keeping the arms and legs still and extended, and the body relaxed. They then glide as far as possible with the eyes open.

FIG. 4

FIG. 5

To stand from a face float they should bring the knees to the chest, then straighten them, placing the feet on the bottom of

the pool and at the same time pulling the arms down hard to the side.

Faults in the face float are:

1. At the start, lifting the body up and dropping down on the water, instead of pushing off across the water.
2. Extending the arms and legs rigidly, instead of resting easily on the water.
3. Tipping the body from side to side because of failure to relax.

IV. Back Float and Stand

In teaching this it is advisable to show the students first of all how to stand from a back float.

Have them stand in the shallow end with the arms horizontal as in the floating position. They then bend one knee to

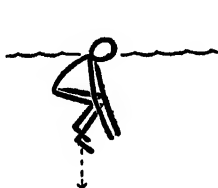


FIG. 6

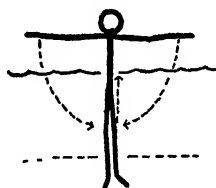


FIG. 7

FIG. 8

the chest, bend the upper body from the hips, head down. At the same time their arms should move from the horizontal position down to the sides; and with the palms of the hands leading, they should forcibly scoop the water, raising the arms in front of the body and placing the foot on the bottom of the pool. Remember that so far the students have not assumed the floating position on the water and are therefore practicing with one foot only off the bottom. On standing from an actual float, both feet are off the bottom and move together in the same position as outlined for one foot.

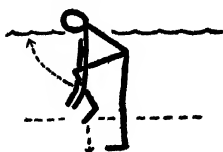


FIG. 9

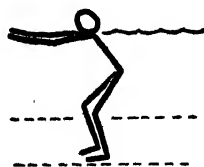


FIG. 10

In teaching a beginning swimming class the floats, one method is to work in pairs, one assisting the other. To help another in

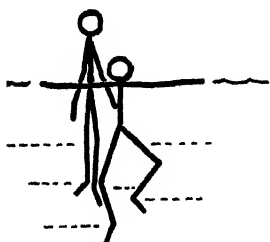


FIG. 11

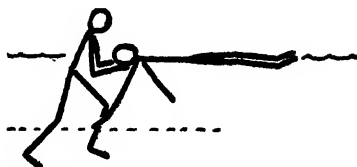


FIG. 12

the back float one person stands directly behind and keeps the other's head from going under water. The other raises the arms to horizontal, bends the knees so that the shoulders are under water, drops back easily giving a slight push from the bottom with both feet. As the body falls backward the feet will rise from the bottom. The amount of rise will vary according to individual buoyancy and the position of the head. While floating, the back should be arched slightly, the body relaxed, and the student should keep the lungs filled with air, letting only a little out at a time.

From the float they should try to stand without assistance. If necessary, the person assisting should put his hands under the back of the head and lift.

FOR THOSE WHO HAVE DIFFICULTY FLOATING, REMEMBER

1. Relax and arch the back
2. Keep the lungs full of air
3. Keep the arms horizontal or higher over head
4. Keep the chin in and the head back
5. Keep the legs extended but relaxed
6. Don't curl the body up
7. A student may float in a vertical or a horizontal position
8. Have assistance if necessary but work alone as soon as possible.

V. Change of Body Positions

Confidence and body control are gained through the ability to change from face floating to back floating and *vice versa*.

1. To Turn from the Face to the Back:

Push off easily from the side in the face float, extending the arms and legs, face in the water. Pull the left arm down to the side, pushing the water away. At the same time turn the head and shoulders to the left, and move both arms to the horizontal position and float on the back.

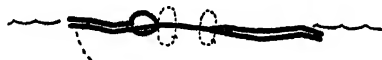


FIG. 13



FIG. 14

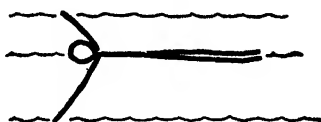


FIG. 15

Breathing on the Turn: Hold breath while turning. When the turn is completed, breathe out through the nose before taking in another breath. This will prevent any possibility of choking while turning.

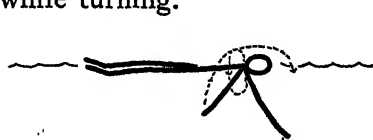


FIG. 16



FIG. 17

2. To Change from the Back Float to the Face Float:

Assume the back float position, arms horizontal. Push the left arm down against the water, turning the head and shoulders to the left, and at the same time swing the right arm out over the water, finishing with both arms extended forward and the body on the face.

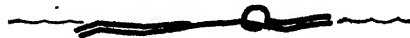


FIG. 18



FIG. 19

Practice these body changes, turning both to the right and to the left. The turns described are to the left. To turn to the right, do the same movements with reversed arm motions and turn the head and shoulders to the right.

3. *To Change, from the Face Float to the Right Side:*

Bring the left arm which is extended forward down to the side of the body and at the same time turn the head to the left and look back over the left shoulder. Be careful not to turn the head too far or the body will roll over on to the back; or not to let the left arm reach back on the water beyond the left side as this will also swing the body over on to the back.

The side floating position is more difficult to hold than the back or face float.

VI. Elementary Back Stroke

In swimming all the strokes be sure that the fingers are together, the thumbs are close to the fingers, and that the hands are slightly cupped.

Having eliminated the fear of the water and mastered the back and face floats, the novice is now ready to learn the movements that will produce progress across the water. One of the simplest strokes is the **ELEMENTARY BACK STROKE**.

1. *Land Drill for the Arms*

A. Stand erect with the arms close to the side and the chin in.

Count 1: Move the hands to the shoulders following the body line the entire way. The elbows should be back and close to the body, the fingers pointing downward until the hands reach the shoulders; then the fingers should point diagonally outward and upward.

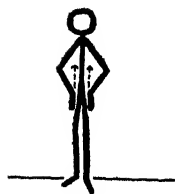


FIG. 20



FIG. 21

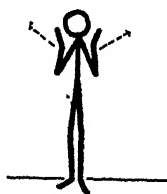


FIG. 22

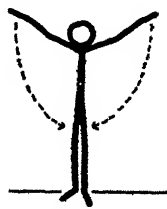


FIG. 23

Count 2: Extend the arms easily diagonally outward half way between a horizontal and an upward position.

Count 3: Pull the arms forcibly to the side.

Pause at the end of the pull.

B. Land Drill for the Legs

Sit down and lean the upper body back on the hands.

Count 1: Keep the legs straight and together, the toes pointed.



FIG. 24

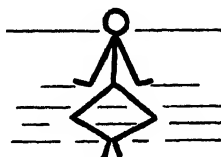


FIG. 25

Count 2: Draw the legs up, keeping the heels or the soles of the feet together, and spreading the knees.

Count 3: Spread the legs easily apart, the toes leading.

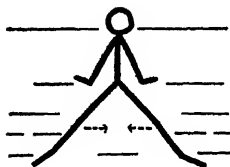


FIG. 26



FIG. 27

From the spread position **DRIVE THE LEGS FORCIBLY TOGETHER.** Hold the legs together, the toes extended, and pause after the drive.

C. To Practice the Arms and the Legs Together on Land

Stand, with the feet together and the arms at the side. Practice A and B using one leg and both arms as follows:

Count 1: Keep the legs still. Move the arms to the shoulders as described.

Count 2: Bend one leg turning the knee outward. Move the arms diagonally to the $\frac{3}{4}$ reach position.

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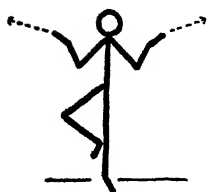


FIG. 28

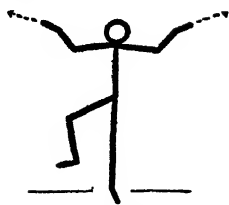


FIG. 29

Count 3: Move the leg outward and bring it with a snap to the other leg and at the same time PULL the arms to the sides.

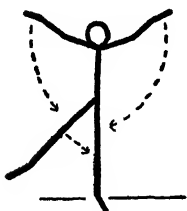


FIG. 30

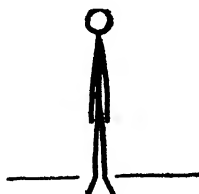


FIG. 31

Hold position with the arms at sides and the legs together. Practice this drill using first one leg and then the other so that both get equal practice.

Breathing: Inhale through the mouth while resting with the arms at the sides and the legs together. Exhale while doing the stroke.

2. Water Drill

Practice the whole movement in the water starting from the back float. If necessary to practice either the arms or legs alone, the following methods may be used:

A. Arms

Take a floating position, supporting the legs by grasping the gutter rail with the toes or by having another



FIG. 32

person hold the feet. Concentrate on the arm movements only.

B. *Legs*

Face the center of the pool, grasp the gutter rail with the hands over the shoulders and extend the legs forward.

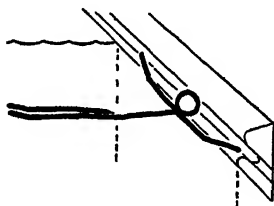


FIG. 33

Concentrate on leg movement only.

The proper position of the body while doing the ELEMENTARY BACK STROKE is—

1. Keep the body straight.
2. Keep the chest up, the head well back and the chin in.

Common Faults are—

A. Of the body position:

1. Bringing the head too far forward so that the legs sink.
2. Doubling forward at the waist.

B. Of the arms:

1. Not keeping the arms close to the body when the hands move to the shoulders. This causes resistance against the water.
2. Bringing the arms or hands out of the water at any time.
3. Not making the movements continuous throughout the stroke.
4. Not getting an equal pull with both arms.
5. Bringing the arms up across the body instead of following the sides.

SWIMMING ANALYZED

6. Not pushing against the water with force on the pull to the sides.
7. Not holding the glide at the end of the pull.

C. Of the legs:

1. Bringing the knees up to the chest instead of turning them out.
2. Bringing the feet up too fast and KICKING OUT instead of moving the legs apart easily. The force of the drive comes on the down movement.
3. Letting the legs float together instead of driving.
4. Not holding the legs together at the end of the drive.

The finished stroke should be one continuous movement from the beginning until the arms reach the sides and the legs come together—not an automatic 1-2-3.

VII. Elementary Crawl

The crawl taken up at this point is a very elementary one, the work being given with the idea of the student going on to the advanced stroke. There are several different methods of starting the crawl, dependent on the age and type of class. With children it is very easy to start them with a plain dog paddle motion of the arms. With adults this method has proven unsatisfactory since practice of the dog paddle has subsequently hindered their lifting the arms out of the water. The straight arm method is therefore taught first in the progression of the crawl with older students. For the legs the regular flutter kick is used.

Land Drill for the Arms

A. Position

1. Stand in a single line around the pool.
2. Place the hands on the knees, bending the upper body forward from the waist, heads up.
3. Raise one arm straight forward.
4. Raise the other arm straight back.
5. Keep the elbows straight.

In the above position move the arms in a windmill fashion. PULLING down towards the body with the forward arm, and



FIG. 34

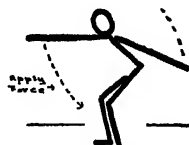


FIG. 35

lifting the arm that is back, straight up and over to the forward position.

Make the movements continuous.

B. Breathing

It is essential to work on the proper breathing from the beginning. As soon as the arms work fairly easily practice breathing while the arms are moving. It is correct to breathe in when EITHER the left arm or the right arm is back, but the intake must be consistent, always on the same side.

Land Drill for the Legs

1. Lie down flat on the stomach.
2. Extend the arms back, placing the hands under the thighs.
3. Keep the legs together and straight, toes pointed and turned slightly inward.

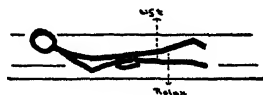


FIG. 36

With the back arched, lift and lower the legs alternately from the hips. Keep the ankles and the knees relaxed.

Water Drill for the Arms Alone

A. Standing

1. Stand in lines in the water with the feet apart.
2. Bend the upper body forward until the shoulders are submerged.

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3. Assume the arm position already given in the land drill.

In this position practice the arm movements noting the following points:

- a. That the forward arm reaches well out in front of the body on a line with the same shoulder.
- b. That the hand is slightly cupped and enters the water with the thumb side down, then turns FLAT for the downward pull.
- c. That the downward pull of the forward arm is straight and toward the same knee.
- d. That the arm on the recovery reaches out over the water to the forward position.
- e. That the motion is continuous and that the arms are always in opposite positions, i.e., when one is forward the other is back; when one is pulling down the other is recovering.

After this has been practiced with the face out of water, continue the same movements of the arms *with breathing*, and with the face in the water. In breathing turn the head slightly to the side and inhale through the mouth. Turn the head forward and breathe out through the nose under water, keeping the head fairly high.

B. *Walking across the Pool*

As soon as possible practice the arm movement, walking across the pool. Gradually let the feet drift back off the bottom of the pool until a face float position is assumed. At this point concentrate on the movements of the arms and pay no attention to the legs.

Water Drill for the Legs Alone

A. *Position*

1. Grasp the side of the pool and hold the body in a face floating position, head up.

2. Keep the legs parallel, the toes pointed slightly inward.

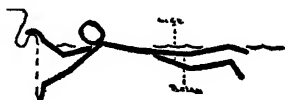


FIG. 37

In this position practice the flutter kick, noting the following points:

- a. That the kick is from the hips.
- b. That the kick is a series of even thrashes up and down.
- c. That the ankles and knees are relaxed.
- d. That the heels *only* break the surface of the water.

Using the same push off and the same arm position as for the face float, begin the flutter kick and continue across the pool. Take a breath before starting, hold, and then exhale slowly while moving across the pool.

Water Work for the Legs and Arms Together

Using the face float, push off from the side of the pool and work both the arms and the legs at the same time. At this point pursue a fairly slow continuous movement of the arms and an even leg drive. Breathe in once on every complete arm movement.

Shoulder Drill

Since flexibility of the shoulders is essential to proper arm movement in the crawl, it is wise at this point to emphasize the shoulder motion. This is best practiced on land.



FIG. 38

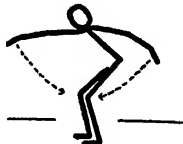


FIG. 39



FIG. 40

Assume the same position as in the land drill for the arms, i.e., upper body bent forward, the hands on the knees. Drop

the hands from the knees so that the arms hang from the shoulders. Be careful not to move the body further forward, or slump. Lift and rotate first one shoulder and then the other in a shrugging shoulder motion. As one shoulder is raised the other is lowered. At first use only the shoulders letting the arms continue to hang. Gradually lift and reach forward with the arms as the shoulders lift and move forward. Then pull down as the shoulder is dropped.

After practicing this on land apply the shoulder movement to the stroke in the water with a lift of the shoulder, a bend of the elbow and a reach forward.

In teaching beginners it is wise to divide the work so that they work on both the Elementary Back Stroke and the Elementary Crawl in turn. This interchanging of strokes tends to hold the interest more easily, particularly as some find one stroke easier than the other.

VIII. Jumping and Diving

It is important even with beginners to have them jump and then dive into the water from the side of the pool. In doing this they gain confidence. The longer this is delayed the harder it seems to do, and the longer it will take them to try it.

At first have the students start the jump and the dive from as near the water as possible. Then, as they are able, have them gradually start from a higher point. Start them as early as the second or third lesson.

BREATHING

Before students jump or dive into the water explain to them that before they enter the water they must *breathe in*; while they are going down they must *hold their breath*, and that while they are coming up to the surface they can then *breathe out* slowly.

A. *Jumping Into the Water*

1. Stand at the side of the pool, breathe in, jump forward, entering the water feet first.

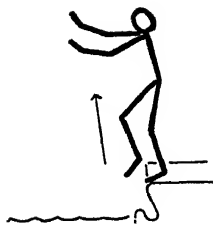


FIG. 41

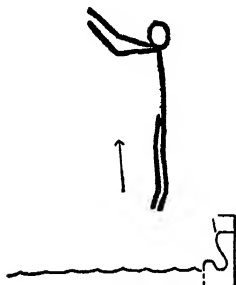


FIG. 42

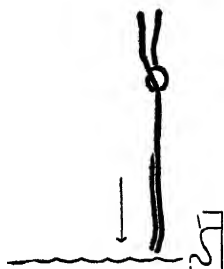


FIG. 43

B. *Diving Into the Water*

1. Sit at the side of the pool. Place the feet in the gutter rail. *Spread* the knees. Raise the arms over

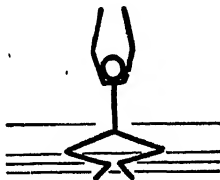


FIG. 44

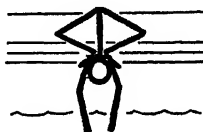


FIG. 45

the head locking the thumbs together. Roll forward over the water until the fingers are almost in the water, then drop in having the hands enter the water first, the entire body in a straight line. To come to the surface turn the fingers up and raise the head.

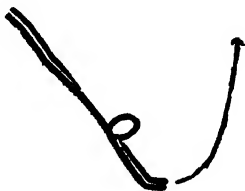


FIG. 46

2. Assume the same *sitting position* at the side of the pool but have the knees *together* rather than spread.

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Roll forward towards the water going up and over the knees instead of through, and give a *push* with the feet.

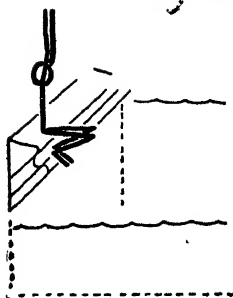


FIG. 47

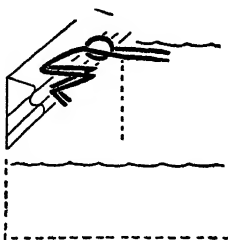


FIG. 48

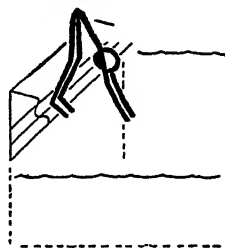


FIG. 49

3. Kneel on *one knee* beside the pool. Place the other foot over the edge of the pool. Raise the arms over the head with the thumbs locked. Bend forward

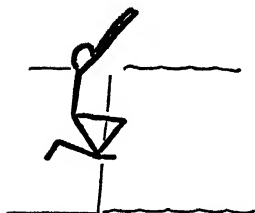


FIG. 50

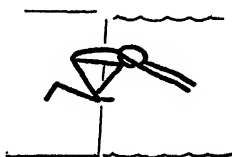


FIG. 51

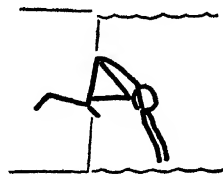


FIG. 52

over the water and drop in giving a slight push with the foot which is over the edge of the pool.

For this kneeling dive have them kneel first on one knee and then on the other. This is so that when they dive and stand on both feet they will have the feel of pushing from both feet.

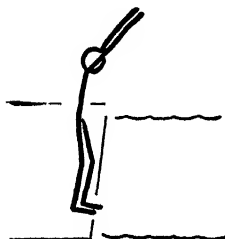


FIG. 53

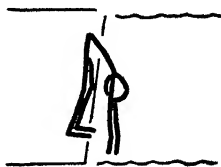


FIG. 54

4. Stand at the side of the pool and grasp the edge with the toes of both feet. Raise the arms over the head, locking the thumbs together. Bend the body well forward over the water until the balance is lost. Keep the head down and between the arms and drop forward giving a lift of the feet as they leave the side of the pool.

For more work on diving see later chapters. Very few beginners would get beyond this point in an ordinary length swimming course.

TEACHING HINTS on the work through the elementary stages:

1. Progress in most cases will be slow. Therefore, do not push beginners too fast.
2. Find strokes and methods that suit the individual.
3. See that beginners lose all fear of the water and can *relax*. Spend much time on this point alone as a person will never be a swimmer until RELAXATION and BREATHING are developed.
4. It is essential for potential swimmers to have absolute confidence in the person who is teaching them to swim.

IX. A Lesson Plan for Beginners

There follows a possible outline of work for beginners in a series of ten lessons, one-half hour in length, given twice a week.

LESSON I

- 10 minutes—Getting used to the water, using simple water games.
- 10 minutes—Work on breathing. Explanation and practice.
- 10 minutes—Work on the Back Float and Stand.

LESSON II

- 5 minutes—Review breathing.
- 15 minutes—Review the rest of Lesson I, spending the time where needed as shown by the progress made during the first lesson.
- 10 minutes—Work on the Face Float and Stand.

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LESSON III

10 minutes—Review Lesson II as needed.

5 minutes—Work on change of body positions.

15 minutes—Work on the land drill and the first water practice of the Elementary Back Stroke.

LESSON IV

5 minutes—Jumping in from the side of the pool at the shallow end.

10 minutes—Review breathing and the Back and Face Floats.

15 minutes—Work on the Elementary Back Stroke.

LESSON V

10 minutes—Work on the “sitting” dive from the side of the pool.

15 minutes—Land and water work of the Elementary Crawl.

5 minutes—Review the Elementary Back Stroke.

LESSON VI

10 minutes—Work on the “sitting” and “kneeling” dives from the edge of the pool.

10 minutes—Work on the Elementary Back Stroke.

10 minutes—Work on the Elementary Crawl Stroke.

Emphasize breathing throughout the entire lesson.

LESSON VII

Review Lesson VI.

LESSON VIII

15 minutes—Diving from the standing position. Have the pupil come up after the dive and go to the side of the pool using the Elementary Back or the Elementary Crawl Stroke.

15 minutes—Work on the Elementary Back Stroke and Elementary Crawl Stroke.

LESSONS IX and X

Review Lesson VIII.

CHAPTER II

LOW INTERMEDIATE SWIMMING

- I. The Side Stroke
- II. The Single Overarm Stroke
 - A. The Regular Single Overarm
 - B. The Single Overarm with $\frac{3}{4}$ Turn
- III. A Continuance of the Crawl Stroke
- IV. Stunts
- V. Diving
- VI. A Lesson Plan for Low Intermediate Swimmers

I. The Side Stroke

Some people can learn this stroke fairly easily. It is placed at this point in the progression of strokes because it is the foundation for two other strokes, i.e., the Single Overarm Stroke and the Double Overarm or Trudgeon Stroke. In some cases the Breast Stroke is learned before the Side Stroke, particularly when the swimmer trying the Side Stroke has difficulty in maintaining the side balance. The Side Stroke when learned correctly is a very restful stroke and is a necessity for life saving.

Start the swimmer on the *right* side. However, it is correct to swim the side stroke on *either* side.

A. *The side push off and balance* should be learned first.
Start for the push off

- 1. Stand in the water with the left side to the side of the pool.
- 2. Grasp the gutter rail with the left hand.
- 3. Place both feet against the side of the pool with the knees bent and the body on the right side.
- 4. Extend the right arm out across the water, just below the surface of the water.

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5. Rest the head easily on the right shoulder and look out across the water.

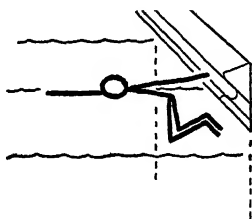


FIG. 55

NOTE: The position of the head in the side stroke governs to a great extent the body balance. It is easier for some to maintain their side balance by pulling the chin in and looking back over the left shoulder. Either this position of the head or that outlined under 5 is correct.

Push-off from side of the pool

1. Breathe in and push off from the side of the pool with both feet.

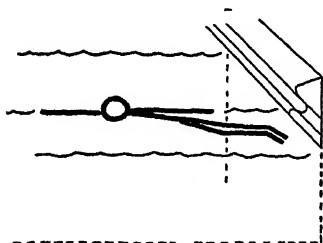


FIG. 56

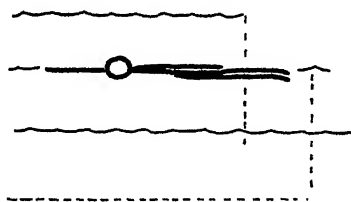


FIG. 57

2. Hold the breath and breathe out slowly during the glide.
3. Rest the left hand on top of the left thigh and extend the right arm straight ahead.
4. Keep the legs together with the left leg on top of the right.

NOTE: To maintain the side balance move the head and shoulders forward or backward as needed. Do not jerk.

LAND DRILL FOR THE LEGS ALONE. SCISSORS KICK

Position assumed for the land drill

1. Lie down on the right side.
2. Rest left leg on top of right and keep the toes pointed.
3. Extend the right arm forward under the head.
4. Rest the left arm on the floor in front of the body for balance.

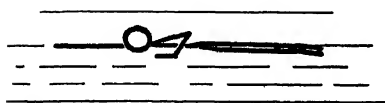


FIG. 58

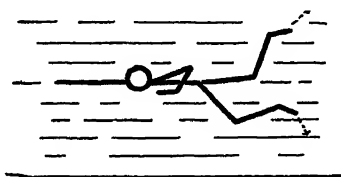


FIG. 59

Movements in the land drill for Scissors Kick

Count 1. Bend the knees, the left knee bending in front of the body, the toes pointed down; the right leg bending backward at knee.

Count 2. Extend the upper (left) leg straight forward with the toes leading, and the under (right) leg straight back.

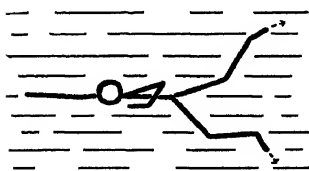


FIG. 60

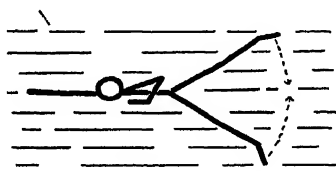


FIG. 61

Count 3. Drive the legs together to the starting position, pulling with the sole of the left foot and the instep of the right foot. *Hold* the legs together at the end of the snap. Repeat No. 58.

Common faults of the legs

1. Bringing both the knees up in front of the body on Count 1. This tends to curl the body up in a ball.
2. Moving the under leg down instead of back on Count 2.

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3. Moving the upper leg out instead of forward on Count 2.
NOTE: Remember a pair of scissors opens in only one direction.
4. *Kicking* legs out instead of moving them easily apart on Count 2.
5. Letting the legs drift together instead of driving them together on Count 3.
6. Letting the legs cross at the end of the drive instead of stopping when they come together.
7. Reversing the scissors kick, i.e., top leg going back, under leg going forward.

WATER DRILL FOR THE LEGS

Position for the water drill holding on to the side of the pool:

1. Stand with the right side to the side of the pool.
2. Grasp the gutter rail with the left hand.
3. Place the right hand down low under the water with the palm of the hand against the side of the pool, the fingers pointed down.



FIG. 62

4. Supporting the body in the above manner with the hands, raise the legs straight out from the side of the pool with the left leg on top of the right, the legs together and the toes pointed.
5. Hold the body balanced on the right side, with the head out away from the side of the pool and float easily on the right side with the head resting on the right shoulder.

Water drill at side of the pool

In this position practice the movements of the legs as learned on land.

Water practice for the legs away from the side of the pool:

1. Use the side push-off to start the body in motion.
2. Practice the leg movements only.
3. Keep the body on the side and go as far as possible without losing the side balance.

LAND DRILL FOR THE ARMS ALONE

Position

1. Stand in a single line.
2. Bend the upper body slightly to the right.
3. Extend the right arm straight sideways on a line with the body, the palm down.
4. Rest the left hand against the left thigh with the arm straight and the palm of the hand against the body.

RIGHT ARM ALONE

Movements

Count 1. Pull the right arm straight down three quarters of the way to the body.



FIG. 63

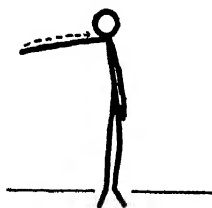


FIG. 64



FIG. 65

Count 2. Keeping the elbow back and close to the body lift the hand up to a position just below the right shoulder, the fingers pointing down.

Count 3. With palm down and the fingers pointing away from the body, slide the hand easily forward to the starting position. *Hold* this position at the end of the stroke.



FIG. 66



FIG. 67



FIG. 68

LEFT ARM ALONE

Movements

Count 1. Bring the left arm across close to the body reaching as far ahead as possible without turning the shoulders.



FIG. 69



FIG. 70



FIG. 71

Counts 2-3. Pull the arm down in a straight line with the body, keeping the hand close to the body. The pull ends



FIG. 72



FIG. 73

with the hand on the left thigh and the elbow straight as in the starting position. Repeat Fig. No. 68.

Hold the position at the end of the stroke.

BREATHING ON THE SIDE STROKE

Breathe in during the *hold*, just before the arms and the legs start moving, and *breathe out* during the stroke.

BOTH ARMS TOGETHER ON LAND

Position

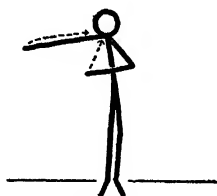


FIG. 74



FIG. 75

Take the same position as described under Land Drill for the Arms Alone.

Movements

Count 1. Pull the right arm down as the left hand reaches forward across the body.

Counts 2-3. Lift the right arm up to the shoulder and move it easily forward while the left arm pulls down, stopping on top of the left thigh.



FIG. 76



FIG. 77

Hold the position at the end of the stroke.

WATER DRILL FOR THE ARMS

Position

1. Stand in the shallow end of the pool with the water covering the shoulders. Extend the arms in a line

SWIMMING ANALYZED

with the body and practice the same movements as in the Land Drill. Practice this standing still first, then moving across the pool as the arms pull.

2. From the side balance position at the side of the pool push off using the same arm movements as described above.

ARMS AND LEGS TOGETHER

Position

Take the side push-off position at the side of the pool.

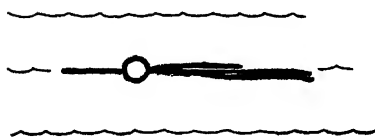


FIG. 78

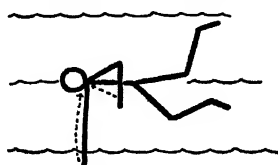


FIG. 79

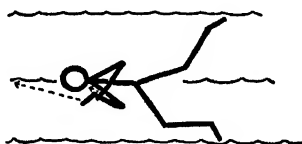


FIG. 80

1. Push off from the side. Straighten the legs and extend the arms.

Hold the side balance position.

2. Practice the arms and legs together.

Hold the side balance position. *Take a breath* during the hold. Then practice the arm and leg movements *breathing out* as the arms and legs move.

Count 1. Pull the right arm down $\frac{3}{4}$ of the way to the body. Bring the left arm across the body. Start the bend of the knees, the left in front of the body; the right backward, just after the arms start moving.

Counts 2-3. Lift the right hand up to the right shoulder and move it easily forward while the left arm pulls down, stopping on top of the left thigh. At the same time the legs separate and drive together.

Hold and glide after the stroke has been completed.

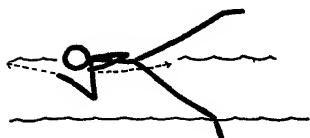


FIG. 81



FIG. 82

As soon as the swimmer is able to control the balance and get the correct coördination more force should be used. Starting with the side push-off position the swimmer should gradually go a longer distance on the stroke.

Common Faults

- 1. Using force during the recovery movements.
- 2. Swinging the left arm out away from the body on the recovery instead of keeping it close to the body. This causes resistance against the water.
- 3. Pulling the left arm down with a circular sweep away from the body instead of pulling it down in a straight line.
- 4. Letting the left arm go beyond the thigh at the end of the pull causes the body to turn over onto the back.
- 5. Pulling the right arm down too far under the body, causing the body to bob up and down on the water instead of gliding ahead on the water.
- 6. Pushing the right arm forcibly forward on the recovery. This makes for a jerky movement and wasted energy.
- 7. Lifting either hand out of the water at any time.
- 8. Not *holding* at the end of each complete stroke. This cuts off the force of the stroke.

General Hints

- 1. Make all the recovery movements slow and relaxed.
- 2. In the arm coördination, first the right arm pulls and then the left.
- 3. Be sure that the movements of the arms are on a line with the body.

4. Keep the body straight. *Don't buckle at the waist.*
5. Rest the head easily on the water. Don't move it too far forward or too far backward as this will tend to swing the body from the side position.
6. Narrow down the separation of the legs if they can not be driven forcibly together.

II. The Single Overarm Stroke

A. The Regular Single Overarm

The side stroke is a preliminary stroke for the Single Overarm. The only difference in the two strokes is that in the Single Overarm the left arm is lifted out of the water on the recovery instead of recovering under the water. The motions of the left arm can be practiced first on land.

Position:

1. Stand in a single line around the pool.
2. Take the same position as for the Side Stroke.



FIG. 83



FIG. 84

Movements of the Left Arm

Count 1. Lift the arm from the side and keeping the arm fairly high reach forward to a point slightly beyond the face.



FIG. 85



FIG. 86



FIG. 87

Counts 2-3. Pull the left arm down close to the body finishing the pull with the hand on the left thigh.

Hold the position at the end of the stroke.

Movements of Both Arms Together

Practice the movements of both arms the same as in the Side Stroke except that on Count 1 lift the left arm and reach forward carrying it fairly high. Repeat Fig. 83.

NOTE: When done in the water the left arm lifts out of the water and reaches forward clearing the water until it enters the water with the fingers leading, at a point beyond the head.

Arms and Legs Together

Same as in the Side Stroke.

Breathing

Same as in the Side Stroke.

The faults of the right arm and the legs are the same as in the Side Stroke.

Common Faults of the Left Arm

1. Bringing the arm too high out of the water which tends to submerge the body.
2. Not lifting the arm high enough, so that it drags through the water on the recovery, causes resistance against the water.
3. Reaching too far forward with the arm which causes the body to roll over on the face instead of staying on the side.
4. Circling the arm around the head instead of reaching straight forward.
5. Letting the elbow drop on the entry instead of having it follow the hand into the water.
6. Throwing the arm forcibly forward making the whole stroke jerky.

B. The Single Overarm with $\frac{1}{4}$ Turn

In order that the student may more easily learn the Trudgeon or Double Overarm stroke it is sometimes a great help to include a Single Overarm with $\frac{1}{4}$ turn.

SWIMMING ANALYZED

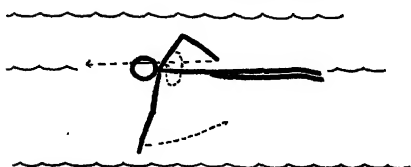


FIG. 88

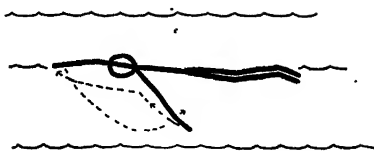


FIG. 89



FIG. 90

Note the reach of the left arm causing the body to roll onto the face.

Movements of Both Arms Together

Count 1. Pull the right arm down as the left arm lifts out of the water and reaches forward as far in front of the body as it can. During the reach the body rolls on to the face.

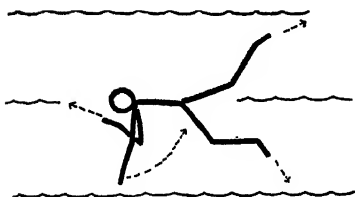


FIG. 91

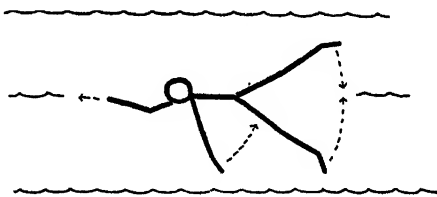


FIG. 92

Counts 2-3. Lift the right hand up to the right shoulder and slide the hand forward under the water as the left arm pulls down to the left side and the body rolls back to the right side.

There is a very short *hold* at the end of each stroke with the left arm against the side of the body and the right arm extended forward. The body is on the side.

The Movements of the Legs are the same as in the Single Overarm and Side Stroke.

NOTE: *Hold* the legs together while the body is on the face. *Kick* when the body is on the side as in the Side Stroke.

Breathing

Same as in the Side Stroke.

Faults

1. Pulling the arms down and out away from the body instead of straight down. The right arm particularly is apt to do this as the body is rolling over to the face, as it pulls down.
2. Letting the left arm drag through the water on the recovery instead of lifting it out of the water.
3. Bringing the left arm too high out of the water.
4. Circling the left arm around the head instead of reaching forward with it.
5. Kicking when the body is on the face instead of on the side.

The faults of the right arm and the legs are the same as in the Side Stroke.

III. A Continuance of the Crawl Stroke

In each swimming lesson a portion of the time should be spent on the Crawl Stroke. See Chapter I. In Beginning Swimming the pupil has already started the stroke and it should be developed by continued practice.

Suggestions for the Low Intermediate swimmer when working on the Crawl Stroke.

1. Leg practice at the side of the pool.
2. Kicking across the pool using the Face Float position.
3. Kicking across the pool with the flutter boards.
4. Using a toe hold at the side of the pool and practicing the arm movements alone.



FIG. 93

5. Review of the Shoulder Drill described in Beginning Swimming.

6. Practice of the arm movements alone going across the pool.
7. Practice of the whole stroke across the pool.
8. Practice of breathing for the Crawl Stroke.
 - a. Standing in the shallow end, do the arm movements and breathe once every stroke.
 - b. Swimming across the pool, breathe in on every stroke.

NOTE: The flutter kick is used throughout the stroke. Emphasize relaxing the ankles and the knees and an even beat in the rhythm. In practicing the arm stroke, work for a relaxed recovery of the arms and a straight pull down of the hands when they enter the water.

In the Crawl the head should be carried fairly high with the water just covering the eyebrows. When breathing in the Crawl, turn the head just enough to get the mouth out of water on the inhalation.

IV. Stunts

Advantage. Many people work very hard trying to master the strokes in swimming. By introducing stunts a certain tension is relieved and unconsciously the swimmer relaxes the body. Stunts bring in an element of play.

1. *Spinning Top*

Assume the back floating position. Cross the feet at the ankles and draw the knees up spreading them apart. Keep the hands on each side of the body and scull with them, turning the body in a circle, first to the right and then to the left.

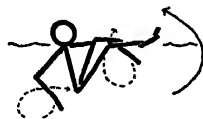


FIG. 94-A

2. *Swimming Forward on Back*

Lie on the back with the legs extended. Keep the legs together and the toes pointed. Using the hands on the

same side of the body, pull with them so that the body moves forward. The pointed toes should come out of the water.

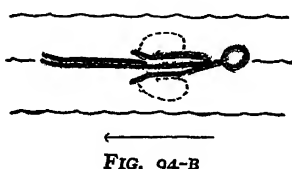


FIG. 94-B

Log Rolling

Lie on the back, floating with the arms and legs extended straight and together. Start the roll with the shoulders and turn over and over.

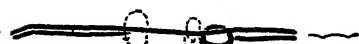


FIG. 95



FIG. 96

Cork Screw

Use the crawl stroke. Make a half turn so that one stroke is on the face, the other on the back. Always turn in the same direction.

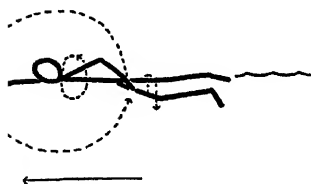


FIG. 97

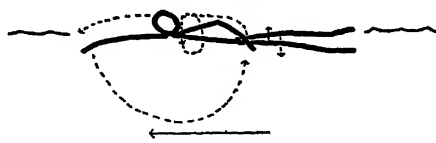


FIG. 98

"On Watch"

Swim a few strokes forward. Change to treading water, lifting the body high on each drive of the legs. Place one hand over the eyebrows and turn in place looking around.



FIG. 99

6. *Forward Roll*

Tread water. Throwing the upper body vigorously forward, pull the arms under, the chin on the chest and roll forward.



FIG. 100



FIG. 101

7. *Backward Roll*

Tread water. With the head back throw the upper body backward, scull, draw the knees up slightly and roll backward.

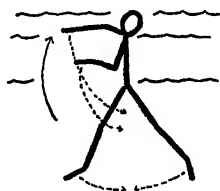


FIG. 102



FIG. 103

8. *Butterfly*

With the body on the side, use the scissors kick of the legs. Extend the arms one forward, the other back and "pat" the water.



FIG. 104

9. *Hand Stand*

In the shallow end, work first in pairs—one helping the other. Bending the upper body forward, place the hands

on the bottom of the pool and swing the legs up over the head,

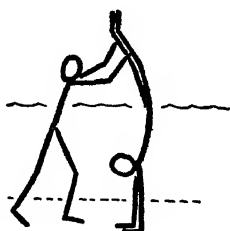


FIG. 105

10. *Crawl Tandem*

Work in pairs, one in front of the other. The one in front places the feet around the waist of the other, swims the arm movement of the Crawl and sets the rhythm. The one behind swims the Crawl, using both arms and legs and follows the rhythm of the one ahead. The tandem can be done in a line of two, three, four or more.

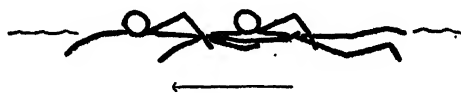


FIG. 106

V. Diving

Most of the "divers" in the Low Intermediate group have simply learned to enter the water head first, with no spring at all, merely falling into the water from the edge of a pool. When necessary, review the steps in diving described in the chapter on Beginning Swimming. The aim at this point is to have the pupil obtain spring and height and enter the water straight.



FIG. 107

(

FIG. 108

SWIMMING ANALYZED

1. Stand back, away from the edge of the pool. Practice an easy spring jump in place. Emphasize the push *up* with an easy ankle and knee action. At first do this with the hands on the hips, then with the arms at the side and moving forward and upward over the head with the spring up.

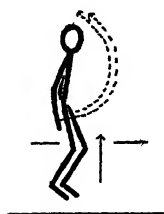


FIG. 1109

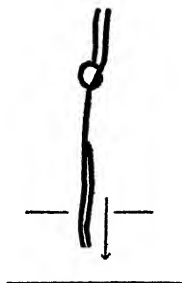


FIG. 1110

2. Stand at the edge of the pool. Extend arms in front of the body and parallel to the water. Grip the edge with the toes. Work on the "Dock Dive." Bring the weight

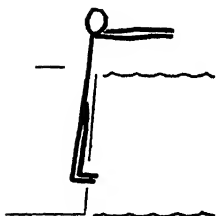


FIG. 1111

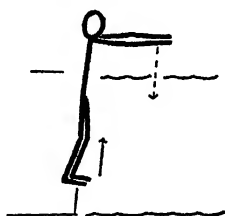


FIG. 1112

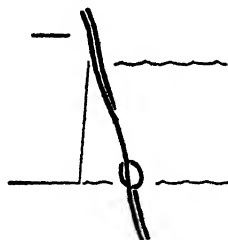


FIG. 1113

forward over the balls of the feet, body erect, bend the knees slightly, then push UP. AFTER the upward push, move the arms down towards the water and bend the

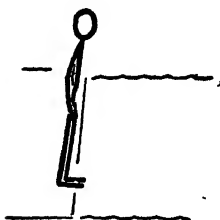


FIG. 1114

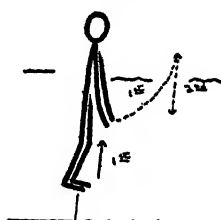


FIG. 1115

upper body and head forward. Enter the water with the body in a straight line.

3. Start the dive with the arms at the side. With the spring move the arms forward and upward.

General Directions

1. Be sure to push up before bending the body forward.
2. Enter the water with the body in a straight line, arms extended, thumbs locked together. The fingers break the water first.
3. Always breathe in before diving, hold the breath going down, let out the breath on coming up to the surface.
4. To come up to the surface from a dive turn the fingers UP and RAISE the head.

The Two Common Faults in the dive are:

- I. The tendency to overthrow the legs.
 - II. Jumping out over the water and landing nearly flat.
- The causes of the two faults—

I. The tendency to overthrow

1. Caused by a push-back of the legs from the side of the pool.
2. Pulling the head in too soon.
3. Pulling the arms down too soon and too forcibly.

Corrections

1. Emphasize an upward push with the feet. Don't relax the legs as they leave the side of the pool.
 2. Keep the head up and in a line with the rest of the body. To enter the water bring the chin in slightly, not with a jerk.
 3. Keep the arms straight and in a line with the body and close to the ears. Keep the arms in front of the body and on the entry into the water do not pull them down under the body.
- II. *Jumping out over the water and landing nearly flat*
1. To aid the pupil to get up from the side of the pool and not out.

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- a. Have the pupils work in pairs. No. 1 is the diver. No. 2 sits down beside No. 1 and extends an arm out over the water in front of No. 1, just below the knees of No. 1. No. 1 dives over the extended arm of No. 2. Have the students alternate work on the dive.
- b. *The One Leg Dive.*
Have the students stand with the weight on one foot, the knee bent. Extend the other leg



FIG. 116

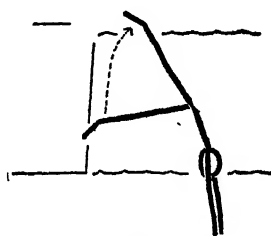


FIG. 117

straight back. Extend the arms over the head and lock the thumbs together. Bend the upper body forward and at the same time lift the extended leg straight up. Keep the upper body forward and push from the side of the pool with the foot which is holding the weight. Both feet should meet in the air and enter the water with feet together and straight, behind the body.

As soon as the students have accomplished a good dive from the side of the pool they go on to the springboard, which is taken up in the following chapter.

VI. A Lesson Plan for Low Intermediate Swimmers

A series of ten lessons one half hour in length given twice a week.

LESSON I

5 minutes—Review the Back and Face Floats.

5 minutes—Work on the side balance for the Side Stroke.

LOW INTERMEDIATE SWIMMING

41

10 minutes—Land and water drill for the Scissors Kick.

5 minutes—Work on the Crawl.

5 minutes—Diving.

LESSON II

5 minutes—Review work on the side balance.

5 minutes—Side push-off and Scissors Kick.

10 minutes—Land and water practice of the arms for the Side Stroke.

5 minutes—Breathing on the Side Stroke.

5 minutes—Diving.

LESSON III

5 minutes—Review work on the Scissors Kick.

5 minutes—Review work on the arms for the Side Stroke.

10 minutes—Arms and legs together in the Side Stroke.

5 minutes—Crawl.

5 minutes—Diving.

LESSON IV

Review Lesson III.

LESSON V

10 minutes—Side Stroke.

10 minutes—Single Overarm Stroke.

5 minutes—Crawl.

5 minutes—Diving.

LESSON VI

Review Lesson V.

LESSON VII

10 minutes—Single Overarm.

10 minutes—Crawl.

5 minutes—Diving.

5 minutes—Stunts.

LESSON VIII

Review Lesson VII and Side Stroke.

LESSON IX

10 minutes—Side Stroke and Single Overarm with $\frac{1}{4}$ Turn.

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10 minutes—Crawl.

5 minutes—Diving.

5 minutes—Stunts.

LESSON X

Review Lesson IX.

CHAPTER III

HIGH INTERMEDIATE SWIMMING

- I. The Trudgeon or Double Overarm Stroke
- II. The Trudgeon Crawl
- III. The Breast Stroke
- IV. The Crawl
- V. Stunts
- VI. Diving
- VII. A Lesson Plan for High Intermediate Swimmers

I. The Trudgeon or Double Overarm Stroke

The Trudgeon or Double Overarm Stroke is very useful in endurance or long distance swimming. If students have already learned the Side Stroke and the Single Overarm Stroke it is a fairly easy matter for them to learn the Double Overarm. This stroke involves bringing both arms out of the water on the recovery which causes the body to roll from the side on to the face.

1. *Leg Movements* (For person swimming on right side)
Grasp the gutter rail, placing the left hand high and the right hand low. Hold the body floating on the right side.

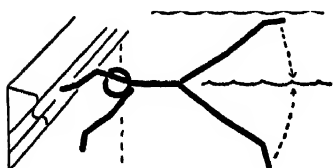


FIG. 118

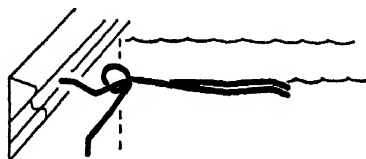


FIG. 119

Count 1. Execute the scissors kick while the body is in semi-side position. *Breathe in* while in this position.

SWIMMING ANALYZED

Counts 2-3. Roll the body forward on to the face and hold the legs together after the drive. Breathe out in this position.

2. *Arm Movements*

Stand in shallow water with the right arm extended forward and the left arm straight back.

Count 1. Recover with the left arm coming out of the water as the right arm pulls down.

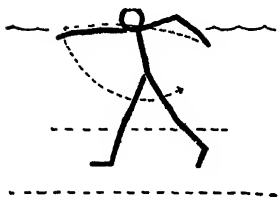


FIG. 120

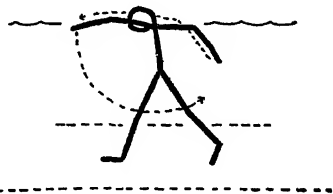


FIG. 121

Counts 2-3. Roll forward on to the face as the left arm reaches forward. Pull the left arm down under the water as the right arm recovers out of the water.

3. *Arms and Legs Together*

Push off from the side of the pool. Hold the body on the right side, the right arm extended forward, the left arm extended back, the legs together.

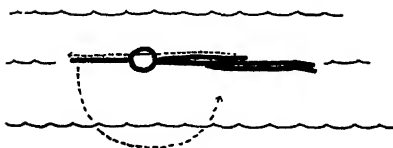


FIG. 123

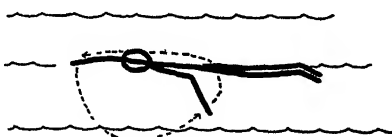


FIG. 124

Count 1. Breathe in and do a scissors kick. Pull the right arm down. Recover and reach forward with the left arm out of the water, rolling the body on to the face. Hold the legs together.

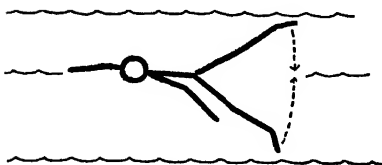


FIG. 125

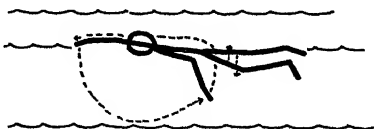


FIG. 126

Counts 2-3. Breathe out. Pull down with the left arm. Do a scissors kick with the legs as the body rolls to a semi-side position. Pause slightly at the end of each complete semi-side position, the right arm extended forward and the left back, and the legs together.

Common Faults

1. Not rolling the body from the side on to the face.
2. Kicking when in the prone position instead of in the semi-side position.
3. Not making the rhythm slightly uneven.
4. Not bringing both arms out of the water on the recovery.
5. Kicking when the body is both on the side *and* on the face instead of *only* when on the *side*.
6. Not breathing *in* when the body is in the semi-side position.
7. Holding the breath when the body is in the prone position instead of breathing out.

TEACHING HINTS

If the students have difficulty in acquiring the rhythm of the Trudgeon stroke have them start with the Single Overarm stroke and go directly into the Double Overarm stroke without stopping.

II. The Trudgeon Crawl

The Trudgeon Crawl stroke makes for greater speed than the Trudgeon stroke as the legs, instead of being held still after the scissors kick, move up and down with the flutter kick. Therefore the leg movements involve a combination of the scissors and flutter kicks. The arm movements, breathing and body roll are the same as in the Trudgeon.

I. *Leg Movements*

Use the same hold at the side of the pool as for the Trudgeon. Practice the scissors and flutter kicks. Nar-

row the scissors kick in the semi-side position and execute the flutter kick when in the prone position.

2. *Both Arms and Legs*

Count 1. Breathe in just before the right arm pulls down. Bring the left arm out of the water and do the flutter kick. Body rolls on to the face for the flutter kick.

Counts 2-3. Breathe out as the left arm pulls down and the right arm recovers. Do the scissors kick with the legs, the body in the semi-side position.

III. The Breast Stroke

As the coördination of the breast stroke is rather difficult for most people and as it is not the foundation for any other stroke, it is placed toward the end in the teaching progression. However, some people, particularly adults, learn it more easily than the other strokes and in their case it would be learned before the other strokes.

1. *Land Drill*

A. Arms Alone

Take a sitting position with the legs extended forward and together, the toes pointed. Reach forward with

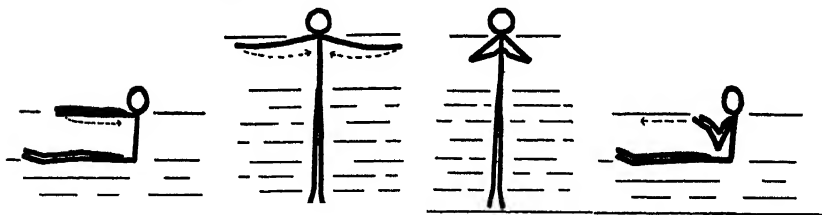


FIG. 127

FIG. 128

FIG. 129

FIG. 130

both arms about on a line with the chest, the hands back to back and together.

Count 1. Push the hands forcibly almost to the side horizontal position and push slightly downward, elbows straight.

Count 2. Bend the elbows and bring the hands together under the chest, the palms down, the elbows close to the sides, the index fingers meeting.

Count 3. Slide the hands easily forward—with the palms down—to starting position—and hold.

B. *Legs Alone*

Sitting on land, lean back with the weight on the hands. Extend the legs in front of the body. See Page 9, Fig. 24.

Count 1. Keep the legs straight and the toes pointed.

Count 2. Draw the legs up with the heels or the soles of the feet together, the knees spread. See Page 9, Fig. 25.

Count 3. Move the legs easily to the side, the width of the spread depending on the individual. See Page 9, Fig. 26. Keep the knees straight. Drive the legs forcibly together to the starting position—and hold. See Page 9, Fig. 27.

C. *Arms and Legs Together*

Take a sitting position, upper body erect, the arms and legs extended forward, the elbows straight, the hands back to back, the toes pointed. Repeat Fig. No. 127.

Count 1. Pull the arms to the side horizontal position, the legs remaining still.

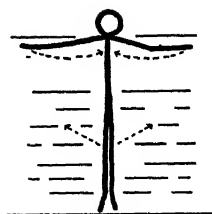


FIG. 131

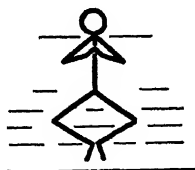


FIG. 132

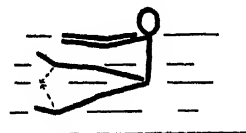


FIG. 133

Count 2. Move the hands into the chest position. Draw the legs up, keeping the heels or the soles of the feet together and spreading the knees.

Count 3. Slide the arms easily forward to the starting position as the legs move apart and drive together forcibly. The arms reach forward a second before the legs come together. Then both arms

SWIMMING ANALYZED

and legs remain together. Hold and glide forward.

Breathing

Breathe in as the arms move to the side horizontal position.

Breathe out as the arms move in under the chest and slide forward and hold.

Practice this first on land in a sitting position.

Breathe on every arm stroke.

2. *Water Drill*A. *Arms Alone*

Stand in the shallow end of the pool—the water covering the shoulders. Bend the body forward. Practice the arm movements alone.

Commands—Push—bend—reach—and hold.

B. *Legs Alone*

Grasp the side of the pool—one hand above the other or both hands parallel, according to the individual's buoyancy. Extend the legs backward and practice the frog kick. Do this to counts—and on Count 1—keep the legs extended, together, and *still*. When arms and legs are worked together the legs should never move on Count 1.

Commands for the Legs—Bend—apart—together—and hold.

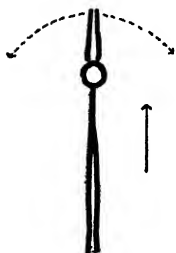


FIG. 134

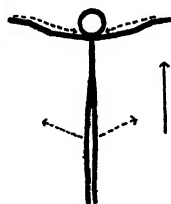


FIG. 135



FIG. 136

C. *Coördination*

Drop off easily from the side and start across the pool using both the arms and the legs. Start with

arms and legs extended. The face may be out of the water the entire time, or out as arms pull to the side horizontal position and submerged as the arms move in to body and reach forward. Either way is correct.

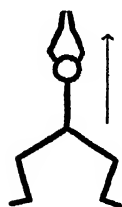


FIG. 137

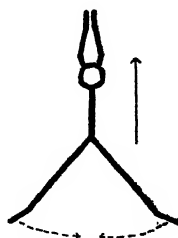


FIG. 138

Common Faults

1. Arms

- a. Pushing too far back, beyond the side horizontal position.
- b. Pushing from chest forward with a jerk.
- c. Bringing the hands out of the water at any time.
- d. Not holding for the glide when the arms are extended at the end of the stroke.
- e. Pulling too far down in the water on Count 1.

2. Legs

- a. Using a scissors kick instead of a frog kick.
- b. Kicking the legs apart instead of sliding them apart.
- c. Not driving the legs together.
- d. Starting the legs too soon. Remember that on Count 1 the arms alone move.
- e. Not holding the legs together for the glide at the end of the kick.
- f. Drawing the knees up under the body on Count 2 instead of spreading them.

3. Breathing and Body Balance

- a. Breathing at the wrong time breaks the rhythm of the stroke.

- b. Turning the head to the side at any time makes for incorrect body balance.

IV. The Crawl

The Crawl is the fastest of all strokes. Work on an elementary crawl has been outlined in Chapters I and II. The Crawl taken up at this point is a more advanced stroke. Supposing the students have done the elementary work, they should begin to cover more distance with the stroke as a whole, find out where their stroke is weak, and work on the parts as needed.

A. *Arms*

The arms work alternately in a windmill fashion. They are always the same distance apart and the movement is continuous. As one arm is pulling the other arm is recovering *out of the water*.

Movements of One Arm Alone

Pull: The pull should start with the fingers as the hand enters the water in front of the body and on a line with the same shoulder. The elbow on the entry should be higher than the hand. A downward pressure should be used immediately and the hand should be cupped. The arm should be pulled straight down without wavering. The hand should not be pulled too far under the body. Instead it should be kept slightly to the side and as the elbow bends towards the end of the pull the thumb almost touches the side of the body in coming to the surface.

Recovery: During the recovery the arm should be relaxed, the elbow slightly bent. In moving the arm forward over the water the elbow is slightly higher than the hand. A movement of the shoulder starts the arm moving forward with the elbow leading until the hand is almost on a line out from the shoulder, and then the hand leads.

Practice for Both Arms

1. *On Land—Standing.* Bend the upper body forward. Reach forward with one arm, the other arm straight back. Move the arms as described above.

2. *In the Water.* Take a toe hold at the side of the pool. Practice the arm movements alone.
3. Work across the pool using the arms only.
4. Work the length of the pool using the arms alone.

Faults of the Arms

1. Crossing the arms in front of the head.
2. Letting the elbow drop on the downward pull causes the hand to slide through the water instead of pulling.
3. Moving the arms out on the pull instead of downward.
4. Wavering the hands through the water.
5. Holding the arms rigid on the recovery.
6. Swinging the arms out to the side on the recovery.
7. Lifting the arms too high above the water.
8. Using too much force on the recovery of the arms.

B. *Breathing*

Correct breathing in the Crawl should be timed with the arm movements. The head should be held fairly high and the inhalation should be taken slightly to one side, and always on the same side. Whichever side is natural to the swimmer is correct. Assuming it is more natural to turn the head to the left, the swimmer should *breathe in* when the left arm is back and as the right arm is recovering, and *breathe out* as the left arm recovers. For general crawl swimming the swimmer should *breathe in* EVERY STROKE. In sprinting the swimmer would not breathe in so often.

Practice

1. Holding on to the rail with the body in the face float position, practice breathing *in* through the mouth and *out* through the nose. Avoid lifting the head too high for the inhalation. Turn slightly to the side and open the mouth. In breathing out avoid lowering the head.
2. Assume the toe hold position and practice breathing and the arm movements.
3. Pushing off from the side of the pool, use the arm movements of the crawl and concentrate on the correct breathing.

Faults

1. Holding the breath.
2. Failing to breathe *in* on every complete arm stroke.
3. Breathing—first on one side and then on the other instead of always on the same side.
4. Turning the head too far back when breathing in.

C. The Crawl or Flutter Kick

The Crawl kick involves the legs from the hips to the toes. The legs should be kept parallel and the toes should be pointed and turned slightly *in*. The ankles and knees should be relaxed. The kick is an up and down motion of the legs from eight to twelve inches in depth and extending from the hips to the toes with the *heels only* breaking the surface of the water. After an *even* beat of the legs has been accomplished the individual swimmer may adopt the six, eight, ten or twelve beat crawl. The depth of the kick is dependent to a large extent on the position of the head and shoulders. The water is squeezed out from between the legs and the extended ankle causes a push against the water.

Practice

1. *On land lying flat on the face*, arch the lower back and raise the legs.
2. In the water, grasp the rail. Practice the kick alone.
3. Pushing off from the side of the pool, hold the arms extended in front of the body and practice the kick.
4. Using flutter boards, practice the kick the length of the pool.

Faults of the Legs

1. Kicking only from the knees.
2. Holding the legs rigid from the hips instead of relaxing the ankles and knees.
3. Making the kick jerky and irregular.
4. Not keeping the legs parallel.
5. Kicking deeper with one leg than with the other.
6. Bringing most of the leg out of the water on the up beat instead of breaking the surface of the water with the heels alone.

Faults of the Body Position

1. Keeping the body too rigid.
2. Holding the head too high or too low. Remember the eyebrows should break the surface of the water.
3. Rolling too much from side to side.
4. Not keeping the body in a plane position.

General Hints for the Individual

1. Coördinate the stroke as a whole.
2. Make all the movements even and not jerky.
3. Coördinate the breathing with the arm stroke.
4. Work on each separate part of the stroke as needed.
5. Remember that speed is dependent upon good form.
6. Increase the distance each day and analyze your stroke as you swim.
7. Find the leg beat that is best suited to you and work on it.
8. Spend part of each day on correct breathing alone and then apply it to your stroke.
9. The position of the head governs to a great extent the position of the body.

The Stroke as a Whole

After practicing the arms, legs and breathing separately, still more time should be spent on the stroke as a whole. For this practice, swim lengths of the pool slowly having the stroke analyzed simultaneously. Correct the parts as needed and apply the criticism to the whole stroke.

7. Stunts**1. Porpoise**

Swimming a Breast Stroke, on a pull of the arms, jack forward with the upper body and swing the legs back and up over the head. When in six or seven feet of water go to the bottom, turn and push diagonally upward from both feet. A shallow water porpoise can be done going just below the surface each time. Come up with the arms extended in front of the body.

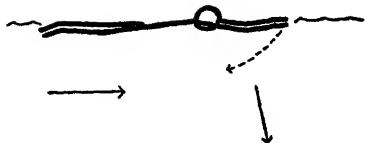


FIG. 139

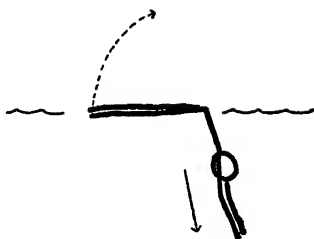


FIG. 140

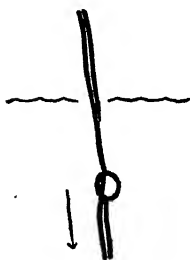


FIG. 141

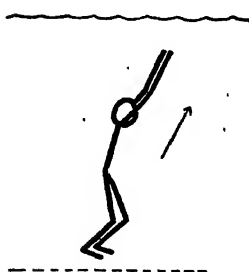


FIG. 142

2. *Submarine*

Holding on to the side of the pool with both hands, place one foot up between the hands. Push down and back, submerging the entire body except for one leg which is

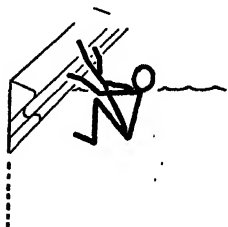


FIG. 143

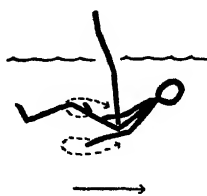


FIG. 144

extended straight up out of the water, the toes pointed. Use the hands and one leg to swim. The extended leg is the periscope and moves back across the water and up and down.

3. *Wheel*

Do a backward somersault in a layout position, scull with the hands and keep going over and over.

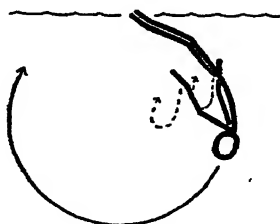


FIG. 145

Walking on Hands

From a hand stand, let the legs overbalance slightly. Walk on the bottom of the pool keeping up with the legs.

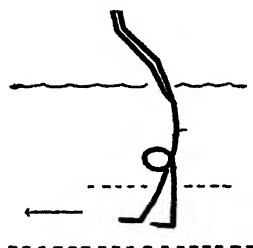


FIG. 146

5. *Marching*

Take a back floating position. Alternately raise and lower each leg out of the water. Scull with the hands. Marching may be done to a fast or a slow rhythm.



FIG. 147

6. *Monkey Roll*

Stand in couples in shallow water, one facing the other. One does a surface dive and spreads the legs apart. The other dives through the extended legs of No. 1. Turn under the water and come up facing each other. Repeat over and over without stopping.

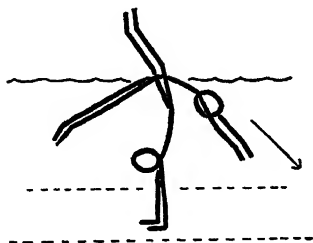


FIG. 148

Torpedo

Start on the back. Arms and legs extended. Submerge the body and scull with both arms extended overhead. Hold the legs straight and together. The pointed toes



FIG. 149

move across the surface of the water, being the torpedo. The entire body is under water.

Deep Water Hand Stand

From a surface dive come back to the surface feet first

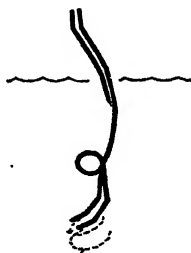


FIG. 150

and with a sculling motion of the hands hold the legs straight together out of the water.

Breast Stroke Tandem

One in front of the other. Leader swims the breast stroke with the arms, the legs are around the waist of No. 2. No. 2 swims with both the arms and legs of

the breast stroke. A line of several swimmers may do this.

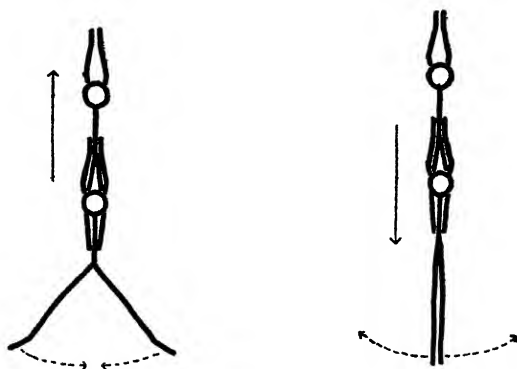


FIG. 152

10. *Reverse Breast Stroke Tandem*

Start the same as for Breast Stroke Tandem. Reverse the movements and move backwards.

VI. Diving

In High Intermediate Swimming instruction is given in spring-board diving.

A. *Elementary Springboard Instruction*

At this point the divers must learn how to use the board in helping them to get the desired height. They must learn how to get the "feel" of the board and acquire the necessary body control and balance. The following methods may be used:

1. Standing on the diving board about three or four inches from the end, swing the body weight forward on to the balls of the feet, bend the knees slightly, then straighten and spring up. Use the arms for balance and lift. Without jumping off the board continue springing up and down, timing the lift of the body with the lift of the board. As the balance is maintained leave the board a little higher each time.

SWIMMING ANALYZED



FIG. 153



FIG. 154

After the feel of the board in place has been conquered, using the same start enter the water feet first, having gone up into the air with the lift of the board. Enter the water with the body straight.



FIG. 155



FIG. 156

Start back from the end of the board and approach with one step, then jump to the end of the board, leave with the board and enter the water feet first.

With the same approach enter the water head first. During the jump or hurdle raise the arms to the side horizontal position. When landing on the end of the board lower the arms and as the board lifts swing the arms forward and upward over the head locking the thumbs together. Take off from both feet. At the height of the spring move the arms and head slightly forward and enter the water head first, keeping the body in a straight line, the arms extended over the head, the

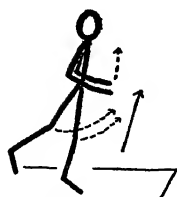


FIG. 157



FIG. 158

feet together, the knees straight and the toes pointed.

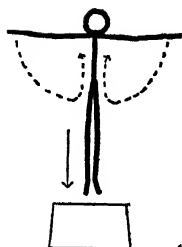


FIG. 159



FIG. 160

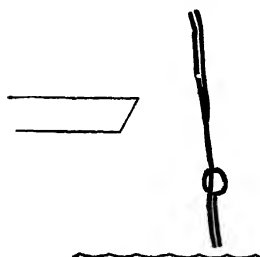


FIG. 161

During the hurdle or jump, the knees should come high up in front of the body so that the diver can come down on the end of the board in such a way as to get more height on the dive.

5. To acquire more height on the hurdle a pole may be extended across the board and back about two feet from

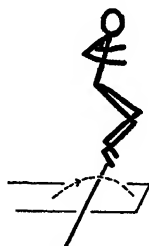


FIG. 162

the end. The height of the pole can be adjusted as needed by each individual. In this way the diver gets the idea of *getting up* for the hurdle.

6. A rope may be extended across the end of the diving

board and out over the water. This should be high and the diver must aim to go up and over the rope. The

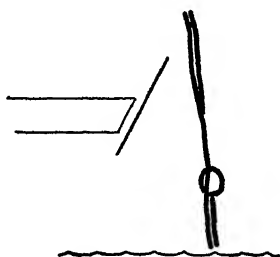


FIG. 163

diver may practice this first entering the water feet first, then head first.

B. Dives

1. *The Running Front Dive*

Having accomplished the preceding work the diver is ready to learn a Running Front Dive. In all running dives the required approach is at least three steps and a hurdle. The diver should therefore pace back from the end of the board the desired number of steps, find where he wishes to start and then always start from the same place and with the same foot. A class in diving may practice the approach first around the side of a pool, not forgetting to use the arms and timing their upward lift with a vigorous upward swing of the arms. After the approach has been practiced the dive itself may be tried. Note the following parts:

a. *Position at the Start*

Step up on the board. Assume an easy, good posture. Stand with the arms at the sides, the head up and the chin in.

b. *Approach and Take-off*

At least three steps and a hurdle are required on the approach. Take the steps naturally and gracefully, lift the knees high during the hurdle and land on both feet on the end of the board. As the board

lifts, push up from the balls of the feet and swing the arms vigorously forward and upward.

c. *Position in the Air*

Obtain as much height as possible. Have perfect



FIG. 164

control of the body. Keep the body straight and the arms extended in front of the body.

d. *Entrance into the Water*

The tips of the fingers should enter the water first, the rest of the body following in a straight line. Hold the arms extended straight and close to the ears. The

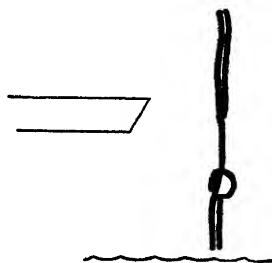


FIG. 165

feet should be together and the toes pointed. This position should be held until the entire body has entered the water.

Faults in the Running Front Dive

1. Jacking on the dive.
2. *Going too far out from the board.* This is caused by leaning over the water on the take-off. Not "*staying with the board*" causes the diver to go out. Moving the arms only to a parallel position

SWIMMING ANALYZED

over the water cuts off the height and takes the diver out. If the steps are taken too fast and too wide the dive will be *out* and not *up*.

3. Overthrowing the legs. This is caused by pushing the legs back on the take-off or by throwing the head forward.

2. The Swan Dive

a. Land Practice

Lie on the floor with the body flat on the stomach, the arms extended forward. Move the arms to the side horizontal position with the palms up, raise the head, arch the back, and keeping the legs together, the knees straight and the toes pointed, lift them up from the floor.

Standing. Practice the position described above, springing upward.

b. From the Board

Standing at the end of the board, keep the body straight, take a side horizontal position with the arms and hold the head up. Arch the back, swing the body forward from the ankles, lose the balance forward and hold the above position until just before entering the water, when the arms should move together over the head and the head should be moved forward.

- c. *With the Approach.* Use the same approach as in the Running Front Dive. On leaving the board, arch the

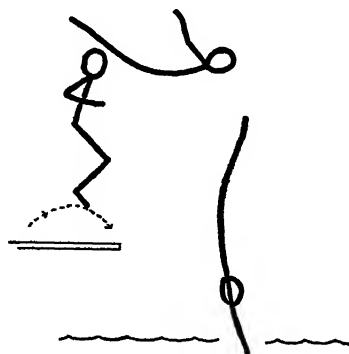


FIG. 166

FIG. 167

lower back and move the arms to the side horizontal position and hold the head well back. Hold this position until just before entering the water, when the arms should come together with thumbs locked over the head, and the head should move forward.

Faults in the Swan Dive

1. Same as in the Running Front Dive.
2. Failing to arch the back.
3. Holding the swan position too long.
4. Not getting enough height, which makes for a poor and hurried attempt at getting the desired body position.

3. *The Front Jackknife Dive*

a. *Land Practice*

Standing erect with the knees straight, bend the upper body forward until the hands touch the ankles. Hold



FIG. 168

the head up. Practice this until it can be done easily. To get the idea of the movement from the hips, stand erect and swing first one leg and then the other for-



FIG. 169

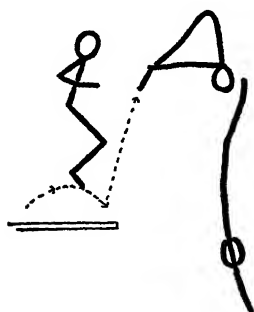
ward. As the upper body is bent forward bring the hands and ankles together.

b. *From the Board*

On the take-off the body should go straighter up from the board than on the Running Front or Swan Dives.

SWIMMING ANALYZED

At the height of the dive the Jackknife position should be taken. To take this position there should be a lift



FIGS. 170-171

of the hips and the upper body should bend forward so that the hands and the ankles meet easily. The head should be raised a little. The knees must be straight. The length of time that this position is held is according to the height obtained. Just before the entry the body is straightened by raising the legs from the hips. The entry should be made not further than six feet from the end of the board and preferably nearer.

Faults of the Jackknife Dive

1. Going out too far from the board. This makes it impossible to assume the proper position in the air.
2. Jacking too soon, which takes away from the height of the dive.
3. Holding the head too far forward which causes an overthrow of the legs.
4. Holding the Jackknife position too long which causes a poor entry into the water.
5. Bending the knees up to meet the hands. To correct this have the diver move the hands to just below the knees and go farther down each time, but always remembering that *the knees must be straight*.

VII. A Lesson Plan for High Intermediate Swimmers

LESSON I

15 minutes—Work on the Trudgeon or Double Overarm, reviewing the Single Overarm with $\frac{3}{4}$ turn if necessary.

10 minutes—Work on fundamentals of Springboard Diving.

5 minutes—Stunts.

LESSON II

Review Lesson I.

LESSON III

10 minutes—Work on the Trudgeon.

10 minutes—Work on the Trudgeon Crawl.

10 minutes—Diving.

LESSON IV

10 minutes—Work on the Trudgeon Crawl.

10 minutes—Work on the Crawl.

5 minutes—Stunts.

5 minutes—Diving.

LESSON V

15 minutes—Work on the Crawl.

10 minutes—Work on the Breast Stroke.

5 minutes—Diving.

LESSON VI

10 minutes—Work on the Crawl.

10 minutes—Work on the Breast Stroke.

10 minutes—Diving.

LESSON VII

Review Lesson VI.

LESSON VIII

10 minutes—Work on the Breast Stroke.

10 minutes—Review the Trudgeon.

10 minutes—Diving.

LESSON IX

Spend entire time on Diving and Stunts.

LESSON X

Review all the above strokes and stunts learned.

CHAPTER IV

ADVANCED SWIMMING

- I. The Crawl
- II. The Back Crawl
- III. Starts and Turns
- IV. Diving
- V. Stunts
- VI. Training for Competition
- VII. Organization of Swimming Meets
- VIII. A Possible Swimming Meet Program

I. The Crawl

When students have mastered the crawl as taken up in the preceding chapters it is time to choose the type of crawl best suited to the particular individual.

1. *The Kick*

The type of flutter kick most generally used by American swimmers is the six beat. There are, however, some who are more adapted to the eight beat kick. Therefore, students should try both types before definitely deciding which type is best to develop.

In the straight crawl kick the motions are narrow and even, the thrash is unbroken and has no accent in the timing. The six and eight beat kick have a definite accent. One should avoid too vigorous a kick as too much force tends to stiffen the muscles and make the movements awkward. When practicing the six beat kick count the kicks and emphasize the first and the fourth beats. The number is counted on the downward drive of each leg—ONE—two—three on the pull of one arm and FOUR—five—six on the recovery of the same arm. When practicing the eight beat kick count—one—two—three—

four on each complete arm stroke, making the emphasis—ONE—two—three—four—FIVE—six—seven—eight.

2. *The Arms*

The arms work alternately in the crawl—one pulling while the other recovers. The arm enters the water well in front of the body with the elbow slightly higher than the hand. The pull starts with the hand and the pull is downward towards the body. As the arm comes to the surface it is relaxed and lifted with the palm turned slightly outward. It is then moved forward over the water. After the hand passes the shoulder line it should be extended forward in front of the body with the elbow slightly higher than the hand ready for the entry.

3. *Body Position*

The body should ride the water in a plane position with the head higher than the feet. The shoulders should be as level as possible. The under shoulder will be lowered when the head is turned to inhale but the top shoulder should not be lowered. Rolling the body too much is a fault.

4. *Breathing*

They should learn to inhale once every complete arm cycle and always on the same side. Then for short sprints the number of inhalations should be cut down.

5. *Practice*

The stroke as a whole should be practiced slowly, thus enabling swimmers to concentrate on the movements, have the stroke analyzed and the faults corrected. Swimming too fast in practice puts an emphasis on faults and swimmers continue to make them.

In practicing the stroke in parts, flutter boards may be used with swimmers working on the kick alone. To practice the arms, tie the legs together loosely and work on the arms.

NOTE: Due to the fact that there are so many individual variations such as build and freedom of movement, it will be presum-

ing on the author's part to set down a well defined stroke which is to be used by all swimmers. Therefore, the Crawl as taken up in this book is merely a set of fundamentals which may be used by instructors only as a guide, leaving room for individual modifications.

II. The Back Crawl

This is the fastest of the back strokes. It is used mostly in competition. Once having learned the front crawl it is a fairly easy stroke to learn. The action of the legs is similar to the flutter kick and the arms work alternately as in the front crawl.

I. Land Drill for the Arms

A. Standing—One Arm Alone

Hold the *right arm* straight down to the side. Turn the palm of the hand out turning the thumb in. Letting the elbow lead and relaxing the forearm, move the arm upward with the hand on a line with the same shoulder. When the arm is extended over the head the little finger should be back. Then with the palm of the hand turned back, lower the same shoulder, and pull the arm down and back to the starting position. Make the movements continuous, relaxing the arm on the recovery and pulling forcibly down when the arm is extended over the head. Practice the same movements with the *left arm* alone.

B. Practice Both Arms

Start with one arm extended over head, the other arm down at the side. Move the arms at the same time and

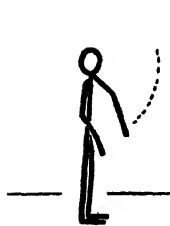


FIG. 172

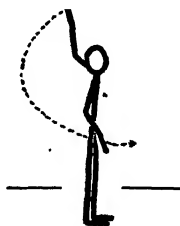


FIG. 173

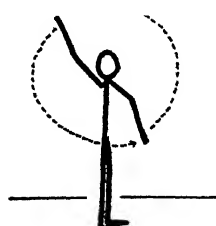


FIG. 174

make the movements continuous. The arms are always in opposite positions.

2. *Water Drill*

- A. Divide the class in twos, one of each group in the water, the other kneeling over the edge of the pool holding one

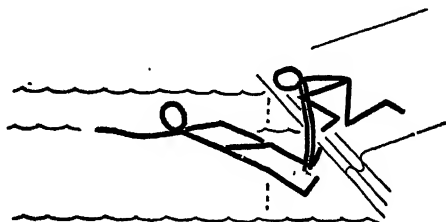


FIG. 175

foot of those in the water, low down against the side of the pool. Have the swimmers place one foot straight under the other and both feet flat against the side of the pool. The body should float on the back, the head should be forward with the chin on the chest. The body may be inclined slightly forward. In this position practice the arms alone. Change position so that the ones and twos have equal practice.

- B. Push off from the side of the pool and practice the arms alone across the pool letting the legs drag.

Faults of the Arms

1. Arching the arms upward across the face on the recovery.
2. Putting the hands in the water around the head instead of extended.
3. Letting the elbow drop on the pull down so that the arm cuts through the water.
4. Completing one whole arm stroke before beginning the other.
5. Pulling the arms down parallel to the surface of the water instead of fairly deep.

Legs Alone

The legs move with a thrash kick similar to that of the front crawl only it is done on the back.

A. *Land Practice*

Lying on the back, kick the legs alternately up and down from the hips, relaxing the knees and ankles.

B. *Water Practice*

Hold on to the gutter. Place the shoulders low against the side of the pool; hold the head forward; practice the kick.

Push off from the side of the pool on the back. Practice the kick across the pool.

4. *Breathing*

Breathe naturally or once to every complete arm cycle.

5. *Coördination*

Using the backward push-off, work on the stroke with the arms and legs working at the same time. Have the body



FIG. 176

in a plane position with the head forward and the hips slightly flexed.

Faults of the Legs and Body Position

1. Drawing the knees up.
2. Not keeping the legs parallel.
3. Not relaxing the ankles and knees.
4. Holding the body too rigid.
5. Holding the head too far back.
6. Having too much body roll.

III. Starts and Turns

A. *Starts—Free Style and Breast Stroke*

There are two commands used in the official racing start.

1. Get on your mark!

On this command the swimmers step to the mark and

assume any starting position. Here they must hold a steady balance. The starter then gives the second command.

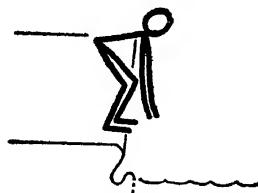


FIG. 177

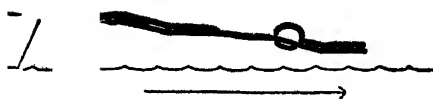


FIG. 178



FIG. 179

2. Pistol or command "Go!"

On this command the swimmers bring their weight forward and at the same time forcibly move the arms forward, straighten the knees and jump out as far as possible. While in the air the back should be slightly arched and extended, the head between the arms. The entrance should be shallow, the body just going beneath the surface, a short glide, and the stroke should be started as soon as possible.

General Hints on the Start

1. On the command "Get on your mark" swimmers should step to the mark gripping the edge with the toes, bend the upper body low over the water without losing the balance forward. The arms may be held in any position, some finding it easier to start with the arms hanging in front of the body, while others place the hands on the knees.
2. On "Go" the body should be straightened forcibly, the push coming from the ankles and knees.
3. On "Go" the head should be held well up and just before entering the water it should be lowered between the arms.

SWIMMING ANALYZED

4. The balance should be held until the command "Go." Three false starts disqualify a swimmer.

Faults.

1. Entering the water too deeply on the take-off cuts off the forward drive.
2. Keeping the head low on the take-off makes the entry too close to the side.
3. Not moving the arms forward with the spring makes a low and jerky take-off.
4. Starting particularly the arm stroke too soon holds the body back.

B. Back Crawl Start

The back stroke swimmers line up in the water facing the start. Both hands hold on to the end of the pool. On

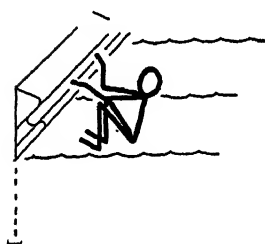


FIG. 180



FIG. 181

the gun or command "Go" they push off on their backs and swim on their backs throughout the race.

General Hints on the Back Crawl Start

1. At the start, face the starting line and hold on with both hands. The feet should be against the side of the pool with the knees bent.
2. On "Go" push off vigorously from both feet and throw one or both arms back over the head.
3. Glide over the surface or just beneath it and start the stroke immediately.
4. It is preferable to move both arms back over the head. In that case the first pull is with both the arms.

C. Turns

1. *Free Style*

Two possible free style turns are—

- a. Breathing before the turn.
- b. Breathing after the turn.

a. *Breathing before the Turn*

The swimmers swim into the end of the pool so that the extended hand is against the end of the pool with the elbow bent. If the left hand is against the end of the pool the turn is to the right, and vice versa. The swimmers inhale and turn, scooping the water in the direction of the turn with the free hand. At the same time the knees are drawn up under the body and both feet are placed against the end of the pool and the push-off is with both feet. On the turn the body is turned completely around and when the push-off is used both arms are extended. The arms are held for the glide. The leg thrash is started immediately. The body may go entirely under water or in some cases a surface push-off is used.

Practice

1. Standing in shallow water with one arm ex-

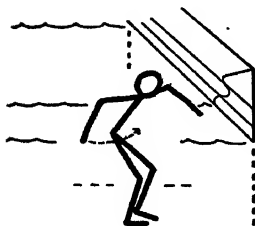


FIG. 182

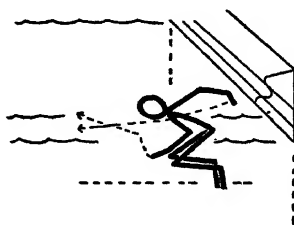


FIG. 183

tended against the side of the pool, *breathe*, turn away from the extended arm—scooping with the other arm—draw both knees up and place the feet against the side of the pool.

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Push from both feet, extending the arms in front of the body, and *glide*.

2. Start away from the side of the pool. Swim into the side and practice the above turn slowly. After this has been done correctly speed up the turn and go into the stroke after the turn.

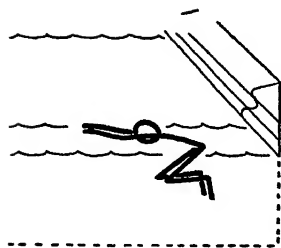


FIG. 184

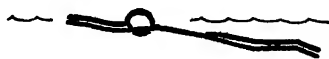


FIG. 185

Practice should be done turning both to the right and left.

b. *Breathing after the Turn*

The last breath is taken one stroke before reaching the end of the pool. As swimmers reach the end of the pool the extended arm hits the side of the pool reaching across the body in the direction of the turn. If with the left arm, it reaches across to the right of the body, and vice versa. The head may be lowered slightly so that the turn is made under water. On turning, the opposite arm scoops in the direction of the turn, the feet are drawn up under the body and placed against the end of the pool, and the push-off is with both feet. Repeat Fig. No. 184. The arms are held in front of the body for a slight glide. The leg thrash is started immediately. Repeat Fig. No. 185.

Practice

1. From standing.
2. From approach to the side.

Faults of the Turn

1. Trying to turn when too far away from the side.
2. Stopping the stroke too soon.
3. Not throwing the head and shoulders in the direction of the turn.
4. Not pushing off from both feet after the turn.
5. Pulling the body up high on the turn.
6. Swimming in too close to the side.

Hints for the Turn

1. Practice each movement slowly at first and then speed up.
 2. Learn to gauge the distance from the end of the pool.
 3. Be able to turn to the right or left.
 4. It is faster to hit the end of the pool with the extended arm rather than grasping the gutter.
 5. Turn the fingers of the extended arm in the direction of the turn and bend the elbow.
 6. Push off evenly from both feet.
 7. All the movements are made together and forcibly.
2. *Back Crawl Turn*

Two back stroke turns are—

- a. Swimmers must remain on their backs the entire time during a race. When nearing the end of the pool grasp the rail with the extended arm. If it is the right arm turn to the right and quickly place the left hand also on the rail so that both hands

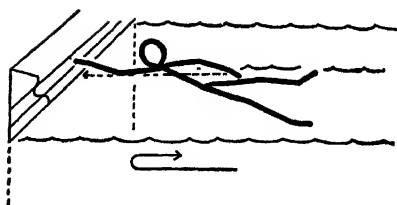


FIG. 187

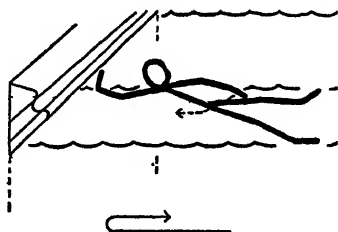


FIG. 188

SWIMMING ANALYZED

are on the side of the pool. At the same time pull the knees under the body and put both feet against the side of the pool. Repeat Fig. No. 180. Straightening the knees, push off hard from the end of the pool and move both arms up over the head. The turn may be done with the push-off under the water, or above it, according to the individual. Repeat Fig. No. 181. After the turn, both arms pull to the sides and then the arms are moved alternately. Practice the turn both to the right and the left. Work on it first approaching a short distance from the end and taking the turn slowly. As the turn is done correctly, increase the speed.

- b. Swim to the end of the pool. Keeping on the back, place the extended arm against the side of the pool and push the body around with that hand. If it is the right arm, the turn is to the right, and if the left, turn to the left. One hand only comes to the side of the pool. The body remains on the back. The hand not against the side of the pool does a shallow pull to help on the turn. On the turn both feet are placed against the end of the pool with the knees bent and the push is from both feet. The arms are thrown back over the head and the first pull is with both the arms, then alternately.

Faults of the Back Crawl Turn

1. Not swimming up to the end of the pool, thus misjudging the distance to the end slows down the stroke.
2. Turning when too far away from the end makes it impossible to get a good push-off after the turn.
3. Swimming in too close to the side.
4. Pushing off with one foot instead of both feet.
5. Pulling the body up too high on the turn causes it to drop down too deep after the turn.

Breast Stroke Turn

On this turn both hands must reach the end of the pool simultaneously. The body is then turned forcibly to the right or left. At the same time both feet are

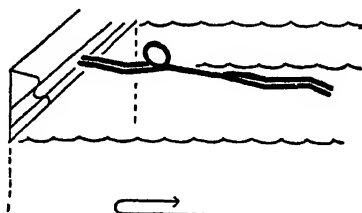


FIG. 189

drawn under the body and placed against the side of the pool and the push-off is with both feet. Repeat Fig. No. 183. The body may go forward just below the surface or above it. Practice slowly at first and then speed up the turn. Repeat Fig. No. 184.

IV. Diving

The additional dives taken up in this chapter are—

1. Back Dive
2. Back Jack-knife
3. Half Twist
4. Full Twist
5. Front Jack with Half Twist
6. Back Flip or Back Somersault
7. Front Flip or Forward Somersault
8. Half Gainer

1. *Back Dive*

a. *Beginning*

To learn a Back Dive the diver should go to the end of the board, stand back to the water, raise the arms over the head with the thumbs locked together. Have support given at the hips. Keep the head and arms well back and bending backward towards the water drop into the water with the body in a straight

SWIMMING ANALYZED

line. The support at the hips is released when the fingers are pointing to the water.

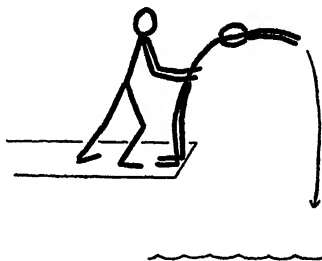


FIG. 190

Hints in learning the Back Dive

1. At first merely fall backwards into the water.
 2. To avoid hitting the water between the shoulders, keep the head well back.
 3. As the balance backward is lost, give a slight push with the toes.
 4. Having another person support the hips is a great help in the beginning.
- b. *Back Dive with Spring and Height*

Position

Stand erect at the end of the diving board. Hold the arms in a forward horizontal position. Have the weight on the balls of the feet and for balance get a high eye mark.

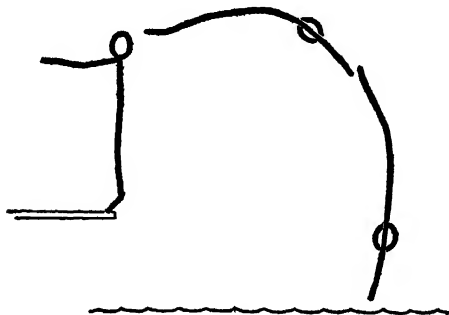


FIG. 191

The Lift

Move the arms slightly sideward and then with *force* drive them forward and upward over the head with the thumbs locked together and at the same time slightly lower—then forcibly lift the heels.

In the Air

When the height of the dive has been reached throw the head backward and arch the back. Hold this position, keeping the body straight.

Entrance into the Water

Enter the water head first, keeping the body straight, with the head between the arms.

Common Faults

1. Going out too far from the board caused by leaning back before the push or throwing the head back too soon.
2. Not keeping the head between the arms.
3. Throwing the legs over caused by the wrong push from the board.
4. Turning on the dive caused by an uneven push-off or by trying to see the water.

Back Jack-knife

To get the feel of entering the water head first from a backward spring, the following preliminary steps are necessary:

- a. Take position toward the end of the board, back to the water and about a foot from the end. Practice an easy spring jump landing on the board each time and keeping the body balance.
- b. Assume the same position at the end of the board. Spring upward and back from the board entering the water *feet first*.

Practice "a" and "b" until the "feel" of leaving the board upward and backward has been obtained.

Position

Take position at the end of the board. Raise the arms in a forward horizontal position. Stand erect and with the weight on the toes.

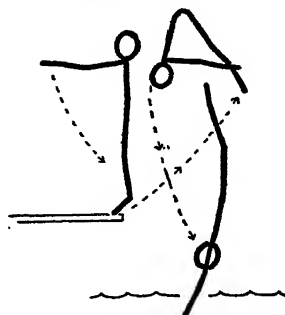


FIG. 192

The Lift

Spring UP and BACK. Lift at the hips and keeping the knees straight bend forward and bring the hands to the ankles.

Entrance into the Water

Straighten the body and enter the water head first.

Common Faults

1. Jumping too far back from the board.
2. Curling the body to get the jack position.
3. Jumping back sideways from the board, caused by fear of hitting the board and a tendency to look over the shoulder.

*Half Twist**Land Drill*

To get the feel of a twist practice first standing on land. Raise the arms over the head to a vertical position. Lower the right or left arm according to which way the twist is to be made, and turn the head to the same side.

Water

To apply the half twist to a dive use either the Running Front or Swan approach. Just before the height

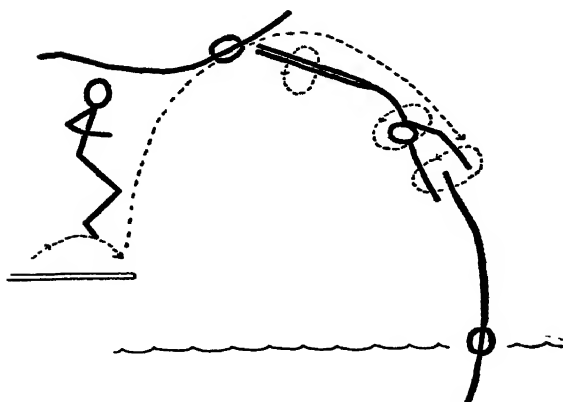


FIG. 193

is reached, lower the arm on the side of the turn, turn the head, and let the rest of the body follow. Arch the back. The entrance should be made with the body straight and facing away from the board.

Common Faults

1. Lowering the head to the side instead of turning throws the body over to the side.
2. Starting the twist too soon takes away from the height and causes a poor entrance.
3. Folding the body up for the turn instead of keeping it straight.

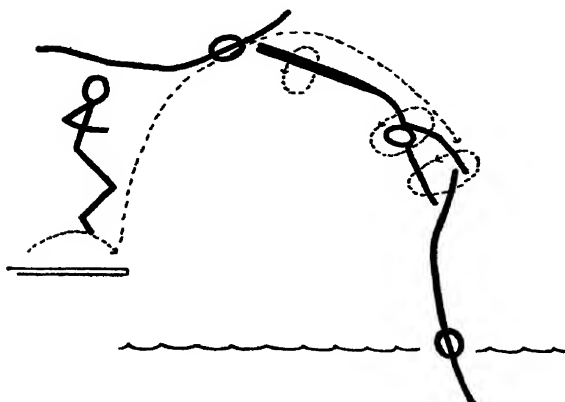


FIG. 194

4. *Full Twist*

Take the same start as in the Half Twist. Turn entirely around. Make a faster turn.

5. *Front Jack with Half Twist*

Combine the two dives already learned. In doing this be sure to jack first, then twist to either the right or the left. Do not anticipate the twist. With begin-

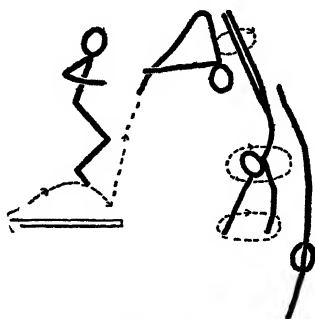


FIG. 195

ners it is a common fault to jack and twist at the same time. Keep each movement separate.

6. *Back Flip or Back Somersault**Land Drill*

Standing. Throw the upper body and the arms forcibly backward and at the same time bring one knee to a tuck position. Practice using alternate

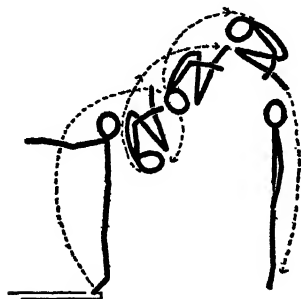


FIG. 196

knees, remembering that when done from the board *both* knees are drawn well up.

Water

Take same position as for a Back Dive. In first attempting the dive aim to get well back from the board. Make the turn and enter the water feet first and with the arms at the sides.

After the preceding practice, aim to get height. Use the arms and head *forcibly* at the height of the spring, throwing the head well back, tuck, straighten the legs, and enter the water feet first and with the arms at the sides. This dive can also be done with the body in a layout position.

Common Faults

1. Not throwing the head and arms forcibly backward.
2. Not springing *up* as well as back on the dive.
3. Not entering the water with the arms at the sides.

Front Flip or Forward Somersault

Land Drill

Stand erect. Drive the upper body, arms and head *forcibly* forward and downward, and at the same time tuck first one knee and then the other high up in front of the body.

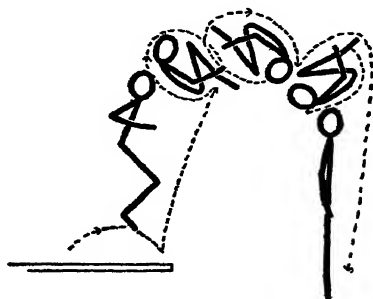


FIG. 197

Water

Use the same approach as for the Running Front Dive. Spring well up from the board, then *forcibly* bring the upper body forward toward the knees, draw the chin well in, drive the arms down and tuck the knees well up. Straighten the body and enter the water feet first and with the arms at the sides.

Hints

When first practicing this dive aim to get well out from the board to be sure of clearing it. Then aim to get height and come closer to the board.

To be sure of opening at the proper time it helps to have some one call "open." If the call does not come the diver should stay in the tuck position and enter the water that way. This avoids landing absolutely flat.

8. *Half Gainer**Land Drill*

Stand with the weight on one foot. Throw the other leg straight forward and at the same time bend the upper body and the arms well back. Start with the arms at the sides and move them up and well back over the head. Practice using alternate feet remembering that the dive is done from both feet.

Water

From a Running Front approach, take off first from one foot. Throw the other leg vigorously forward



and upward keeping the knee straight and bend the upper body well back; at the same time throw the arms vigorously upward and back. Enter the water facing the board and with the feet together. The spring is *out, up*, and back towards the board. Use first one leg and then the other. The real dive is done taking off from *both feet*. Spring *up*, getting as much height as possible, arch the back, move the upper body and arms back towards the board and swing both feet forward and upward over the head. Enter the water facing the board with the body straight, the legs together and the toes pointed.

Hints

1. Get plenty of height.
2. Throw the head and arms forcibly back.
3. When first practicing get well OUT from the board.
4. When using the one foot take-off alternate the foot used on the take-off as the real dive is done from a two foot take-off.

7. Stunts

1. *Bob Swimming*

Have the hands tied behind the back. Swim forward, bobbing up and down.

2. *Shadow Swimming*

With two swimmers. One swims a breast stroke on the surface of the water. The other being the shadow swims a breast stroke underneath. The underneath swimmer can swim on the back or the stomach.

3. *Back Crawl Tandem*

Two or more swimmers in a line. The end swimmer does a flutter kick on the back. All swim the back crawl arm stroke keeping together in rhythm.



FIG. 199

4. *Combination Tandem*

In pairs. Combine the crawl, back crawl and breast strokes. Do two strokes with each and shift without breaking the line.

5. *Walking on Bottom*

Submerge the body by letting out all the air. Grasp the



FIG. 200

toes and walk backward as far as possible holding this position.

6. *Hand Stand Dive*

Grasp the board with the hands, swing the legs up over the head and hold the hand stand position. Push the

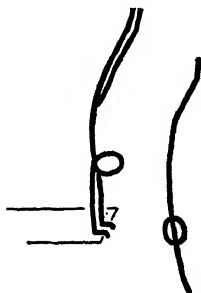


FIG. 201

hands forward and enter the water head first and with the body straight.



FIG. 202



FIG. 203

7. *Rocking-chair Dive*

Lie down at the end of the board. Rock the body forward and backward. Finally rock forward and enter the water head first.

8. *Standing, Sitting, Standing Dive*

FIG. 204

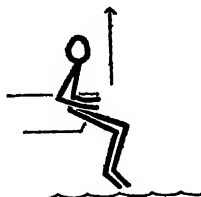


FIG. 205



FIG. 206

Stand on the end of the board. Sit, and as the board lifts up come back on to both feet and dive into the water head first.

I. Training for Competition

1. Mental Attitude
2. Practice
3. Diet

I. *Mental Attitude*

It is very natural for students who have reached a certain proficiency in swimming to wish to compete against others. Under proper supervision competition is not harmful and is very stimulating. In some cases it takes years to become a top notcher. Others are born with more natural ability and so reach the top more quickly. Individuals who develop slowly should not become discouraged as in the long run they often surpass the others. All swimmers cannot reach the top but they can become good enough to enjoy competition, winning sometimes, and also improving their health and physical condition.

Mental attitude has a lot to do with one's success or

failure. A coach, therefore, should learn to recognize types and give confidence to those who need it, and know how to handle those who are overconfident. Swimmers should not worry about the outcome of a meet, and win or lose, should show that they know the ethics of good sportsmanship.

2. *Practice*

Speed in swimming is dependent on *good form*. Swimmers who wish to attain speed should therefore make sure that they have first learned the correct form for the strokes used. Faults in a stroke can be detected more easily when the stroke is executed slowly. The coach can point out the fault and swimmers can correct it first while swimming slowly. In practice swim a distance every day, having strokes analyzed. Do not swim distances for speed except occasionally. Being timed too often makes swimmers forget form in the desire for speed. During the last few weeks before a meet, increase the distance of the swim but still do not be timed too often. Practice the stroke in part where needed. Spend some time each day on starts and turns as many races, particularly the shorter ones, have been lost by a poor start or turn.

3. *Diet*

It is not necessary to diet strenuously in swimming. Meals should be well balanced at all times with plenty of green vegetables and fruits. Rich desserts, however, should be avoided, such as pastry and sundaes. It is important to have eight or nine hours' sleep.

VII. Organization of Swimming Meets

In the organization of swimming meets there is a great deal of preliminary arranging to be done. This work should be taken care of by the coach or the swimming manager, or by some one appointed by them. On these preliminary arrangements to a large extent depends the smoothness with which the meet itself is run off.

Preliminary Arrangements

- a. Posting lists of events. See that the entrants sign for their events before a given date.
- b. Post rules to be used in the meet.
- c. Obtain the necessary officials.
- d. See that the officials are supplied with score cards, pencils and stop watches, a megaphone for the announcer, and paper for the scorer.
- e. See that the pool is a temperature of 74 degrees and that the water in the pool is high.
- f. Have safety pins, towels and a first aid kit at hand.

*Officials and Duties**a. Referee*

Has entire control over the meet, settling all disputes. Assigns judges to their duties. Helps pick first place in all races.

b. Clerk of Course

Has a list of all contestants. Sees that they are in place at the proper time. An ineffective clerk of course can be responsible for a poorly run meet.

c. Announcer

Must keep the audience informed as to what is going on in the meet. Should promptly announce the result of each event.

d. Starter

Has full control of the start of each event. It is his duty to see that the events are properly started. Makes sure the officials are in their places before the start. Explains the start to be used to the contestants. Calls the competitors back if there has been a false start.

e. Finish Judges

They pick first, second and third places. There should be two judges on first place.

f. Timers

There should be at least three timers on first place, two on second and one on third. If the three watches

on first place disagree the middle time is taken. If two of the three watches agree the time registered by the two watches is taken. When two watches are used and disagree the longest time is taken.

g. *Scorer*

Must keep the names of those who place and the time made in each event. Should have a large score card for that purpose. It is helpful to have a black-board on which to post results as well as give them to the announcer. For diving the scorer should have a degree of difficulty chart and on optional dives multiply the number given by the degree of difficulty for that dive.

h. *Diving Judges*

There should be at least three diving judges. They should be placed separately on each side of the board. If the "flash" system is to be used they must have the proper cards numbering 1 to 10. After each dive on a signal from the referee they must pull their numbers given simultaneously. If all three numbers differ the middle number is taken. If two are alike their number is taken for the dive.

VIII. A Possible Swimming Meet Program

1. 100-yard Free Style
2. Breast Stroke (form)
3. 100-yard Back Crawl
4. Crawl (form)
5. 100-yard Breast Stroke
6. Some humorous stunts or a short exhibition of Formation Swimming
7. Diving
8. Relay (100 yards)

CHAPTER V

FORMATION SWIMMING

Stunt and formation swimming are rapidly gaining favor with swimmers and audiences. Many swimmers are not equipped for speed swimming and others do not care to enter into competition, but they do have the ease and grace necessary for formation swimming, and in learning stunts their water ability is greatly improved. An audience is always greatly impressed when stunts and formations are added to the usual events in a meet or when an entire program is given of just stunts and formations.

In the previous chapters lists of stunts have been given and those stunts can be learned first by the individual and then grouped together in formations by a group of swimmers. Today, the play element is being introduced into all forms of sports more than ever and young and old alike can do certain stunts, from the simplest ones to the more difficult.

When doing formation swimming lights can be used very effectively. Underwater lighting, white and colored, is very effective but not always possible. Where a pool is not equipped with underwater lighting, spot lights can be used with different colored lenses flashing a steady colored light on some formations and a revolving of different colors on others. Colored gelatine slides have been used but it is much cheaper and just as effective to use colored cellophane. For this have a revolving disk containing the different colored circles in front of the spot light so that the colors can remain stationary on the formations or revolve flashing different colors as wanted.

In working out formations when done in a series there are three different methods for carrying them out:

- I. Where each stunt is announced individually and then on a given signal (Tom-tom whistle or gong) the group performs the stunt.

SWIMMING ANALYZED

- II. Where the formation series has been learned by the group and a signal is given for them to change from one formation to another without intermediate announcement.
- III. Where the entire change of formation has been learned and is executed from the beginning to end without any signals or announcements. For this music may or may not be used.

To illustrate the three different types of formation—

- I. Use sixteen or twenty swimmers.

Starting Position:

A single line along the SIDE of a pool or dock.

1. Enter the water with a standing front dive, one at a time from left to right, one immediately following the other. All swim under water back to the same side.
2. "*Crawl Across!*"—Whistle—Keep a straight line, and arm movements together, guiding left. Swim across the pool or if out of doors, to a line of floats.
3. "*Submarine!*"—Whistle—Leave the side, one at a time, from left to right, one after the other, making a diagonal line.

Following the "*Submarine*" divide the group, having every other one swim to the opposite side.

4. "*Swimming Backward Upstream!*" Each line facing outside. Whistle—Change places, one line going between

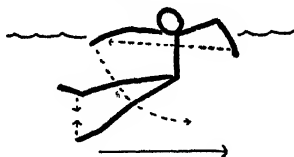


FIG. 207

swimmers in other line, using fairly fast rhythm and keeping each line straight.

5. "*Swimming Forward on Back!*" Lines facing each other, swimmers on back with feet up and knees straight. Whistle—Keep straight lines and swim to the other side.
6. "*Swimming Backward on Face!*" Lines face out, swimmers on stomach, feet up and arms extended in front.

Whistle—Scul backwarks keeping lines straight and feet up. Both lines move away from the side. If there is a

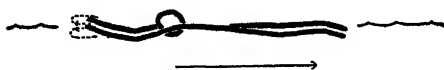


FIG. 208

balcony on one side, all face the balcony. If the gallery is around the pool, have both lines face the outside.

7. "*Forward Roll!*" Whistle.
8. "*Backward Roll!*" Whistle.
9. "*Spinning Top to Right!*" Whistle—"To Left"—Whistle. On a third whistle each line swims to its own side and climbs out.
10. "*Porpoise from a Seal Dive!*" Use pyramid formation—e.g., one entering first, then two together, then three together; then four together. No. 1 does a shallow seal dive and takes two strokes on surface before doing first porpoise. As soon as No. 1 comes up from seal dive, the two No. 2's go in. Whistle—Keep together swimming two strokes between porpoises, all going down and coming up at the same time.
11. "*Hand Stands!*" Form a circle or a letter in shallow water. Whistle—All do hand stands together.
12. "*Raft Formation!*" This consists of four rows having four or five swimmers in each row. The swimmers in each row grasp one another's shoulders, elbows straight.

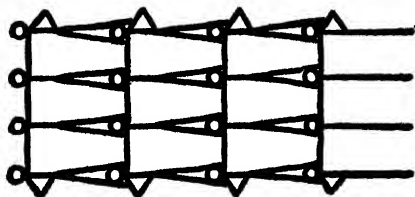


FIG. 209

The swimmers on the outside place free hand on the hip. Whistle—First one row and then the next drops back into a Back Float position, each one placing the feet on the shoulders of the one in front. Those in the front

SWIMMING ANALYZED

row do a Flutter Kick, thus moving the whole formation. The entire formation should keep their arms and legs locked so that the group is held solidly together.

II. Use sixteen swimmers.

Starting Position

Line up along the side of the pool or dock.

Signal: Dive in and come back to the side.

Signal: Move into two circles, eight in each circle, treading water.

Signal: Turn to the right and lying on the back, do a Flutter Kick, keeping the circles intact and small, all moving to

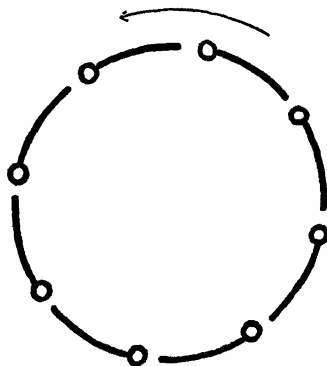


FIG. 210

the right. To keep in a circle formation, scull with the hands as needed.

Signal: Tread water, facing the centers of the circles and grasp wrists.

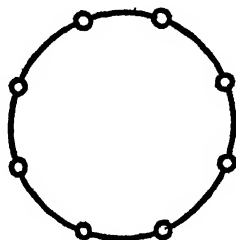


FIG. 211

Signal: Continue to grasp wrists. Lie on the back and do a Flutter Kick causing as much splash as possible, making a fountain in the center of each circle.

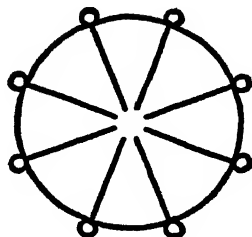


FIG. 212

Signal: Continuing the kick, drop the grasp. Place the hands on the hips. Open the circle making as much splash as possible.

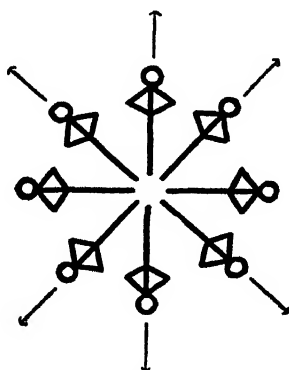


FIG. 213

Signal: Stop the kick and in two open circles all go immediately into "Spinning Tops" to the right.

Signal: All stop and tread water.

Signal: Every other swimmer moves forward to the center—"Swimming Forward on Back." The others continue to tread water.

When those moving forward reach the center—

Signal: All go into "Spinning Tops" to the right, making an outer and inner circle in each circle.

Signal: Those in the center, stop motion and face OUT.

Those on the outside, stop—facing IN.

Signal: The inner circle moves out as the outer circle moves in by "Swimming Forward on Back."

Signal: All change again—swimming on the back.

SWIMMING ANALYZED

Signal: The inner circles face out. Grasp each other's hands at the shoulders, keeping the arms rigid and holding them together. Lie back and float, spreading the legs and keeping them straight.

The outer circles move in, one between each swimmer in the inner circle, who are floating on their backs. Grasp the floaters by the top of the instep, keeping the arms extended and straight. Holding the hands in this

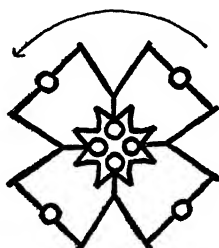


FIG. 214

position, the outer circles swim a side stroke to the right moving the stars. In this formation there are two moving stars.

Signal: The inner circles continue floating. The outer circles tread water so that the stars stop moving.

Signal: The outer circles lie back and float raising their feet

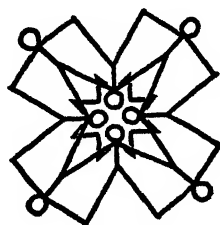


FIG. 215

easily to the shoulders of those who are already floating. All hold the floating star position.

Signal: Stop floating and move back to a double circle. As soon as these are formed all swim Side Strokes into one large circle. Continue the Side Stroke.

Signal: Every third swimmer moves into an inner circle, all still swimming the Side Stroke until there is an inner and an outer circle.

Signal: The inner circle turn to their right, lie on their backs and with a Flutter Kick move to the right.

The outer circle turn to their left, lie on their backs and with a Flutter Kick move to the left. Splash as much as possible.

Signal: Both circles reverse their direction.

Signal: Outer circle reverse their direction and continue kicking. Inner circle face the center and grasping wrists, lie on their backs and kick, making a fountain in the center.

Signal: All tread water.

Signal: Face out. Surface dive and come up at the side of the pool.

III. The third method of using formation swimming is where the entire formation has been learned and is most effective when used with music. For the music a piano and violin can be used, or a Victrola with amplifiers. Any selection with six-eight time or three-four time is best suited to swimming. In swimming to music the swimmers change formations or strokes with the phrases of music and so the entire formation can be done without signals or commands.

CHAPTER VI

MODIFIED WATER POLO

Length of Time:

Eight minute halves.

Players:

Six:—Three Forwards—Two Backs—Goal Keeper.
Designate the teams, using colored caps.

Officials:

Referee—Puts the ball in play and makes all decisions.

Timer—With a stop watch. Take time out when ball is tossed between two players after the ball has gone out of bounds, and after each goal is scored until the ball is put in play by the Referee.

Two Goal Umpires—One stands behind each goal to assist the Referee if necessary in deciding whether or not a goal is scored.

Two Linesmen—One along each side of the pool to retrieve balls thrown out of bounds, and to assist when asked by Referee to put the ball in play.

Scoring:

Five points—Touch Goal.

Three points—Thrown Goal—from without goal area.

Playing Area:

Length and width of a swimming pool. Avoid using the shallow end if possible.

Goals:

Description—How made by scorers.

Object of the Game:

To reach the opponent's goal by use of passes and to score either "touch" or "thrown" goals.

Start of the Game:

Each team lines up at opposite ends. On "whistle" and the throwing of the ball into the center, all players enter the water, the forwards going immediately towards the ball and the backs going part way ready to tackle their opposing forwards. The goal keeper takes a position in front of the goal.

After Each Goal:

The players line up again as for the start of the game. The ball is carried into the water by the goal keeper of the side scored upon, thus putting it in play.

Ball Going Out of Bounds:

On the ball going out of bounds it is given to the nearest opponent of the player who last touched it. This is the rule when it goes out over the side or the end lines. If two opposing players touch the ball at the same time and it then goes out of bounds, it is tossed into the water between the two players and cannot be touched by them until it has first hit the water.

Two Players Gaining Possession of the Ball at the Same Time:

When two players gain possession of the ball at the same time the ball is taken by the Referee and dropped into the water between the two players. The ball must hit the water before touched by either player.

Shallow Water Rules:

1. A player may stand and walk in the shallow water when NOT in possession of the ball. When in possession of the ball the player must pass immediately or swim.
2. A player may stand and throw the ball immediately.
3. A player cannot be tackled while standing with the ball but can be guarded with the arms provided there is no body contact.
4. A player cannot push off from the bottom or side of the pool when in possession of the ball.

Penalty for Push-off:

The ball is given to the nearest opponent who can have an

unguarded throw. A goal cannot be scored directly from an unguarded throw.

General Fouls:

1. To swim under water with the ball.
2. To touch the ball when another player has it in his possession.
3. To hold on to the side of the pool and play the ball.
4. To duck a person who has *not* the ball.
5. To duck a person in such a way as to prevent his being able to let go of the ball or to hold him under water after he has released the ball.
6. To interfere in any way with a player who has not the ball.
7. To splash or kick water at an opponent.

Penalty for All Fouls:

An unguarded throw is given the opponent nearest to the ball when the whistle blows. A goal cannot be scored directly from an unguarded throw.

Goal Area:

The goal area consists of four feet out in front of each goal. No other player except the goal keeper may enter this area unless the ball is there or the player brings it in himself. A thrown goal cannot be scored within this area. The ball may be passed back to another player who is outside this area, who can then make a thrown goal, provided the player in the area gets out immediately and makes no attempt to interfere with the goal keeper. When once inside this area a touch goal must be scored.

General Suggestions:

Before playing the game the players should practice the following technique:

Throwing:

The ball may be thrown with one or both hands. It is a great help to drive the legs forcibly together when making the throw.

Tipping:

If the ball is resting on the water a short pass can be

made to another player by placing the hand under the ball and lifting it.

Catching:

The ball may be caught with one or both hands.

Carrying the Ball:

The ball can be carried in one or both hands or the player may carry it in front of the body while swimming a Crawl or Double Overarm Stroke.

Playing Suggestions:

1. The forwards should keep apart and ahead of the ball.
2. Holding on to the ball so that an opponent is able to duck you delays the game. Therefore it is better to pass the ball at all times rather than be ducked.
3. Backs should not swim so far down the pool that they cannot get back to cover their forwards.
4. One back should stay on each side of the pool and cover that side.
5. The goal keeper can stand in the shallow end. When in the deep water he must tread water in front of the goal.
6. At no time should two players tackle the same person.

CHAPTER VII

THE CARE AND SANITATION OF SWIMMING POOLS

The origin of the swimming pool dates as far back as the third century B.C., but its general use did not become popular until comparatively recent times. There are very few references to swimming pools in literature previous to the middle of the nineteenth century, when Great Britain installed the first indoor bath. It is to the zeal of the English that the teaching of swimming has become universal. The intense desire to swim across the English Channel led to the establishment of "practicing baths" in various parts of Great Britain.

The idea that swimming pool water must be purified and the pool kept clean and sanitary did not follow immediately upon the establishment of either outdoor or indoor swimming pools. The possibility of transmitting disease in swimming pools did not arouse much attention until about 1915, when Manheimer published an article in which he cited a considerable number of authorities who had reported the possibility of contracting infections of the eyes and ears, intestinal and venereal diseases in swimming pools. About this time the American Public Health Association appointed a committee to investigate the sanitary condition of bathing places and recommend standards for their operation and control. Although this committee has published reports from time to time and recommended standards for the operating of public bathing places, it is only during the last two or three years that municipal health authorities have taken any special interest in public or private bathing places or swimming pools.

At present health authorities are studying these conditions and are preparing standards for the care and sanitation of both publicly and privately owned swimming pools which they will

have the authority to enforce. These standards must, of necessity, vary in different places under different conditions, but their ultimate goal will be the same, namely, to minimize the chances of the transmission of disease among bathers and to maintain a clean and sanitary establishment.

Swimming pools vary considerably in their construction, but as a rule, they fall into two main types: those so constructed that the water may be drawn off and replaced at frequent intervals, known as the fill and draw type, and those which are constructed so as to allow the water to pass through a series of sand filters which remove much of the material held in suspension, including bacteria. These are known as the recirculating type and are rapidly replacing the former fill and draw type. It is the recirculating type with which this chapter will be concerned.

The problems which confront the operator of a swimming pool are many and varied and require a general knowledge of sanitary science in order to operate the pool intelligently and successfully. In general there are certain things which must be considered and for the control of which definite standards must be set. They include such matters as the chemical and physical quality of the water; the bacterial quality of the water; cleaning the pool; bathing load limits; operating control and various other problems of more minor importance.

In the first place the construction of the pool should be such as to allow facilities for efficient drainage and cleaning. It should be provided with scum gutters to remove scum, sputum, and other floating materials. The method of circulating the water should be arranged to allow for a complete turnover once every ten or twelve hours through the filters and to allow for an even distribution of the disinfecting agent. A vacuum cleaning apparatus should be installed for the removal of accumulated sediment from the bottom of the pool and arrangements made to exclude all persons except the bathers from the walks and approaches to the pool.

At first it was thought that if the pool were supplied with ordinary pure drinking water which could be drawn off and replaced at daily or semi-weekly intervals it would insure safety

from transmission of infection. It has been found that this theory is fallacious. Water is immediately contaminated by the bathers as soon as they enter and unless this contamination is removed dangerous conditions may result.

The first chemicals to be used in water purification were compounds of chlorine, such as calcium chloride or the hypochlorites. These were found to be very successful in purifying drinking water and were later used in swimming pools. When a method of introducing liquid chlorine into water was devised, this was used in swimming pools with marked success. There is, however, an important difference between the purification of swimming pool water and of drinking water. In the latter case, once the bacterial content has been destroyed by filtration and disinfection, no further treatment is necessary, while in the case of swimming pool water, there is constant recontamination of the water which makes it necessary to secure continual disinfection. Where either liquid chlorine or chlorine compounds are used it is possible to maintain a small amount of residual chlorine in the water constantly. The amount of residual chlorine necessary for effective disinfection varies somewhat with the temperature of the water and the bathing load of the pool. This subject will be discussed more in detail later.

At first many operators installed ultra-violet lamps for purifying the water but this has not proved as satisfactory as the use of chlorine. In the first place, the water is purified only when it comes in contact with the light, and in the second place, it is important that the quartz covering of the lamp be kept clean in order to insure disinfection. On the whole, this method is not so efficient and satisfactory as a chemical disinfectant.

Most of the modern pools are of the recirculating type, the water being pumped through a series of sand filters and receiving a dose of liquid chlorine before it enters the pool. In order to insure proper filtration a coagulant is added to the water at frequent intervals. This coagulant precipitates the suspended materials on the surface of the sand and forms a sticky, gelatinous film which prevents bacteria from going through the sand and promotes the effective removal of other suspended particles. Water thus treated is clear and loses about 95% of the bacteria

which it may contain. Alum is the most efficient coagulant and is the chemical generally used in water filtration.

In order to secure efficient action of both the coagulant and the chlorine, it is essential that the water be alkaline in reaction. This is accomplished in one of two ways. Soda ash may be added at frequent intervals or ammonia may be used. It has been found that ammonia stabilizes the chlorine in the water, thus making it easier to maintain a certain amount of residual chlorine in the presence of organic matter. It should be noted, however, that the presence of ammonia slows down the disinfecting action of the chemical and due allowance must be made.

The methods of adding the disinfectant to the water vary, depending on the form in which the chlorine is used. Chlorine compounds are added directly to the water, calcium chloride being suspended in a cloth bag which is dragged through the water until a uniform distribution is accomplished. Some of the hypochlorites come in liquid form and are added to the water in sufficient quantities to secure adequate disinfection. Usually the containers have instructions concerning the methods of application and the amounts needed. Liquid chlorine is added to the water by means of a mechanical device, of which the Wallace Tiernan Chlorinator is typical. The gas is forced into the water under pressure and the rate can be easily regulated by the operator. There are also devices on the market for adding ammonia as well as chlorine to the water automatically. When using soda ash to secure alkalinity it is important to remember that the chlorine content must be increased when there has been a definite increase in the organic matter in the water.

Besides keeping the water constantly disinfected, it is important that it be clear. The bottom of the pool should be visible at all times in order to insure safety and cleanliness. Some of the factors which increase the cloudiness of the water are lint, improper filtration, contamination with dust, soap, acidity of water, etc. In order to overcome these conditions it is advisable to require that the bathers wear suits free from lint and that they follow the soap shower with clear water. It has also been found that if the showers are taken before donning the bathing suits the chances of adding soap to the pool are mini-

mized. It is also important that all chances of dust contaminating the pool be eliminated. This can easily be done by sweeping the floors in the immediate vicinity with a dampened broom and not allowing persons in street clothes to enter the approaches or walks around the pool. When the filters are cleaned periodically and are functioning properly, when the water is kept alkaline in reaction and when swimmers obey the rules as to lintless suits and the use of soap before entering the pool, the water will be clear at all times, regardless of the bathing load of the pool.

Water in pools thus operated can be recirculated indefinitely, with the addition of fresh water at intervals to replace loss from splashing and vacuum cleaning. It will not be necessary to empty the pool except once or twice a year for inspection and repairs. When it is refilled it is usually necessary to run the water two or three times through the filters in order to remove the organic material and clarify it sufficiently to add the chlorine. After it is once clear it should remain so as long as it is properly operated.

The bacteriological content of the water is very important from the standpoint of health. Certain pathogenic microorganisms may be transferred from person to person while swimming. Usually the transmission has to be more or less immediate since most infectious organisms do not live long in environments outside the human body. Some organisms, such as those which cause diseases of the digestive tract—for example typhoid fever, live for considerable periods of time in water. It is necessary, therefore, to eliminate as far as possible any danger of such transmission. One of the most important means of control is to prevent people who harbor organisms of a dangerous nature using the swimming pool. Any one with an infection of any kind should not be allowed in the pool. Persons who are typhoid carriers or convalescents, those suffering from venereal disease, or skin or respiratory infections are sources of potential danger and they should not be permitted to use any public swimming pool. In order to detect such persons, it is highly desirable that a health certificate signed by a competent physician should be required of every candidate before he is allowed to use the pool. This protects not only the other persons using the pool but often the individual himself benefits thereby. People who

have localized infections frequently spread the infectious agent to other organs while swimming and thereby increase the severity and seriousness of the trouble.

After eliminating these possible sources of infection, it is still necessary to further protect the bathers by disinfecting the water. This has been discussed already but the method of determining the amount of chemical or its efficacy remains to be considered.

When chlorine is used there must be a constant amount present in the water at all times in order to secure disinfection. This is known as residual chlorine and the amount can be determined by a rather simple test. The apparatus for making the test may be purchased or it may be made up in the laboratory. It consists of a series of color standard tubes; a solution of orthotolidine and various tubes and pipettes for measuring and holding the water. The method of making up the color standard tubes and the orthotolidine solution is given in "Standard Methods of Water Analysis," published by the American Public Health Association. When a small amount (1 c.c.) of orthotolidine is added to 100 c.c. of water containing residual chlorine and the solution allowed to stand a few minutes after thoroughly mixing, a greenish yellow color appears in the water. The greater the amount of chlorine the deeper yellow will the color become, while smaller amounts of chlorine deepen the greenish tint.

Tests have been made of the relation of the bacterial content to the amount of chlorine present in the water. This chemical is a very efficient disinfectant and will kill bacteria in astonishingly small quantities. It has been found that dilutions as high as three parts of chlorine in ten million parts of water will render the water free from bacteria while five parts of chlorine in ten million parts of water keeps the water practically sterile. In order to have a shorter method of expressing these dilutions they are usually written in the terms of parts per million (p.p.m.). Thus the above amounts would be written .3 p.p.m. and .5 p.p.m.

Bacteriological tests of the water should be made at frequent intervals over a period of time until the operator is assured that the proper amount of residual chlorine is being maintained

to keep the water practically free from bacteria. Tests for the chlorine content should be made once or twice a day, depending on the number using the pool. When one has ascertained the minimum amount of residual chlorine which will keep the pool free from bacteria it is not necessary to make bacteriological tests oftener than once or twice a week as a check on the efficiency of the chlorine. When bacteriological tests are not made, the chlorine content is usually kept above the minimum actually required to insure purification. Tests have shown that swimming pool water containing a residual chlorine content ranging from .3 p.p.m. to .5 p.p.m. is satisfactory from a sanitary standpoint. Amounts ranging above .5 p.p.m. are apt to irritate the eyes and mucous surfaces and amounts below .3 p.p.m. may not effectively disinfect the water and should not be used unless routine bacteriological tests are also made. These tests should include plate counts of samples taken from either end of the pool and lactose broth tubes, inoculated with 10 c.c. amounts, to detect the presence of colon organisms. If streptococci are present in any numbers, a granular sediment on the sides of these tubes will indicate their presence. A plate count of over 100 bacteria per c.c. suggests that the amount of chlorine is insufficient to properly disinfect the water.

The reaction of the water may be tested in a variety of ways, depending on the operator. Ordinary litmus paper may be used for a gross test and for more exact results the pH may be obtained colormetrically with BromThymol Blue. There should be a definite alkaline reaction with any of these tests. A pH of 7.6 or 7.8 is desirable if the pool is to function properly.

It has been generally conceded that from 12 to 20 persons for every 1,000 gallons of water constitutes a satisfactory bathing load for most swimming pools. Some allow more than this and a few allow less. A pool of 80,000 gallons, such as the one with which the writer is familiar, allows an average load of 20 to 30 persons at one time and a daily load of 140 to 150 persons. The water is completely recirculated once every twelve hours and the chlorine content, which is evenly distributed, is kept at a minimum of .3 p.p.m. Under these conditions the pool remains clear and free from bacteria most of the time. Clouding

of the water or high bacterial counts indicate that something is wrong and the matter is at once investigated. With this amount of chlorine there are no complaints about irritation, while larger amounts always result in complaints from the swimmers. The temperature averages about 75° F. and the bottom of the pool is clearly visible at all times.

In order to maintain a swimming pool in satisfactory condition from the standpoint of sanitation and to minimize the possibility of transmission of disease, it is necessary to formulate rules which shall be strictly enforced, requiring bathers to present a certificate of health and to report any subsequent illness or indisposition; to use only suits provided by the operator; to use showers and toilets before entering the pool and to encourage the coöperation of the patrons in keeping the pool clean and free from any possibility of infection. In this way no one need fear the swimming pool as a source of infection and there need be no danger except in unforeseen emergencies.

CHAPTER VIII

EPIDERMOPHYTOSIS

(*Athlete's Foot*)

Swimming pools and shower rooms have been heartily blamed for the great spread of ringworm of the feet (athlete's foot) in this country. It is certainly true that the wet floors of pools and showers can and do transfer the infective agent from person to person. No swimming instructor to-day can afford to ignore this possibility. In order that those in charge of pools may know the recent medical ideas regarding "athlete's foot" this brief account is included in this book.

The direct cause of this infection of the skin is a microscopic fungus of which there are numerous varieties. The worst of this fungus is that it is very difficult to kill, both when it is on the human skin and when it is on inanimate objects. It resists very successfully the antiseptics and degrees of heat used to kill ordinary bacteria. However, certain powerful chemicals or prolonged boiling can be counted on to destroy it.

Unfortunately the fungus is now very widely distributed. In fact, any object of suitable material can carry the fungus providing it has come in contact with it. Leather, cloth (especially wool), wood and earth seem very easy materials to infect. The fungus has been recovered from floors, rugs, bathmats and towels. Also it has been found on street-car seats and straps, leather grips of golf clubs, and in ground dust and sand.

When the human skin has "ringworm" it is because one of the varieties of this fungus is living in the top layer of the skin. As flakes and scales of skin are shed, a process which is going on all the time in the human, the fungus in these bits of shed skin infects anything to which it can cling.

In this way clothing, shoes, stockings, gloves, etc., become infected. Swimming suits used over and over by different per-

sons can transfer the fungus unless they are carefully steam sterilized or boiled.

However, the main causes of concern to a swimming instructor are the floors of pool and shower rooms over which swimmers walk barefoot. Attention also needs to be paid to towels which may be used on feet or skin where the infection is present. Since both towels and swim suits at any well supervised pool are thoroughly sterilized after each use, the floors remain the only important source of transfer of infection for consideration here.

In controlling or preventing the spread of ringworm infection the swimming instructor has three measures which may be tried:

1. Recognizing cases of infection and referring them for treatment.
2. Compelling the wearing of shoes or clogs so that bare feet do not come in contact with the floors.
3. Compelling the use of an antiseptic foot bath.

The ease with which these different measures can be applied varies so greatly that some suggestions as to situations in which they work best will be offered.

The first measure, recognition and treatment of active cases of infection, is applicable only where medical services are available and enforceable. It is no part of the function of a swimming instructor to diagnose and treat ringworm. This method, of course, seems the logical one to use. Prevention of spread of colds and ordinary skin infections is accomplished in this way, i.e., by preventing persons suffering from these infections from using the pool until well. For several reasons this method has failed in ringworm of the feet. Medical inspection of the feet of all swimmers and reinspection at frequent intervals is needed. This is obviously impossible at most pools. Treatment needs to continue for weeks or months before the infection is checked, a much longer period of treatment than is necessary for colds and sores. Since 25 to 75% of swimmers are infected with ringworm of the feet our pools would be depopulated if this method of prevention of spread were the only one available.

Nevertheless, there are several ways in which the swimming

instructor can help apply the principles behind this first method of prevention. It goes without saying that she should not allow in the pool any person showing easily visible suspicious looking areas on the skin until certified by a physician to be harmless. However, most ringworm of the feet lies hidden between and under the toes. Contrary to popular opinion, itching and burning are not frequent symptoms in these mild cases and an individual may not realize she has the infection. When an instructor sees the same swimmers regularly, as in schools, colleges, camps and clubs, she can advise them to inspect between the toes frequently to detect early signs of the disease. Most people, especially young folk, seem to regard their feet in the light of the traditional "poor relation" to whom one wishes to pay as little attention as possible!

Signs of the infection vary but the following can be considered evidence of the probable presence of the fungus:

1. Persistent cracking and peeling between the toes.
2. Small blisters which dry up and shed small round scales of skin.
3. Moist sodden flesh or soft corns.

When these signs are present treatment should start. It is not the function of the swimming instructor to advocate any type of treatment, unless she is acting under the direction of a physician. No one type of treatment fits all cases. The commonly advertised remedies for "athlete's foot" are not as good as ones a physician can prescribe nor as likely to be the right treatment for each case.

A second way in which the instructor can help in this method of prevention is by hygienic advice as to cleanliness of feet and stockings and attention to sweaty feet. The fungus finds it easier to grow on the skin of feet that sweat profusely or the circulation of which is poor. Advise swimmers to dry the feet THOROUGHLY after bathing (a procedure very often neglected by young folks), not to wear rubber-soled shoes and woolen socks if the feet sweat easily, to stimulate circulation by cold foot baths and massage, and to seek advice as to how to check the excessive

perspiration if these simple remedies do not avail. This will improve the resisting power of the skin to the fungus and prevent some cases of infection.

The second measure of prevention, the wearing of some form of rubber, paper or wooden slipper, needs only brief mention. This will do little good unless the slippers are worn by their OWNERS and never loaned or borrowed, and unless they are worn continuously from the time the street shoes are removed until they are put on again, except for the time spent in the pool itself. They must even be worn in the showers. The difficulty of thoroughly enforcing the wearing of slippers as well as the expense involved, does not make this method as applicable as other ways.

The third method of prevention, the compulsory use of an antiseptic foot bath, is the present method of choice, from the standpoint of effectiveness, of ease of application and of low cost. Unless the floors of shower and pool rooms are already equipped with sunken troughs for such a foot bath, rubber trays are used. These are usually about two feet square and about three inches deep. They must be placed so that swimmers going to the shower room must step into them and must repeat the foot bath at the entrance to the pool room.

Two solutions have been recommended for such baths after having been tried out extensively in high schools. A solution of sodium hypochlorite * of 0.5 to 1% strength (preferably 1%) is placed in the footbath to a depth of two inches. As the solution is depleted by being carried onto the floor it is replenished so that the tray always contains two inches. The tray should be emptied and filled with fresh solution every second day. The cost for each filling of the tray averages seventeen cents.

A solution of sodium thiosulphate of a 3 to 15% strength (preferably 15%) has also been found effective.* The carrying of this solution on the swimmers' feet distributes the antiseptic onto the floors and insures their sterilization.

These are the only two solutions proven by experiment to be

* Journal of American Medical Assn. August 15, 1931. P. 45. Osborne & Hitchcock.

* Gould, W. L. Ringworm of Feet. Journal of American Medical Assn. April 18, 1931. P. 1300.

effective. Even then ringworm will not be prevented unless each swimmer stands at least a few seconds in the tray with the solution completely covering the feet. Placards of instruction and information and talks by the instructor to the swimmers should not be neglected if this method is to succeed.

Where trays and the use of liquids are not possible a real measure of protection can be afforded by use of a powder—1 part sodium thiosulphate and 4 parts boric acid. This is sprinkled around the pool and on the floors of locker rooms and shower rooms. For the best results it should also be sprinkled in the street shoes of the swimmers.

Enough data is now available to prove that methods of prevention of the transfer of ringworm of the feet from infected floors of pool rooms and showers are effective. Any one in charge of a swimming pool who fails to use some of these forms of prevention can justly be blamed for permitting swimmers to become infected.

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